THE AUTOMOBILE

WEEKLY — NEW YORK—THURSDAY, JUNE 13, 1907—CHICAGO — 10 CENTS

"Firestone" Pneumatics

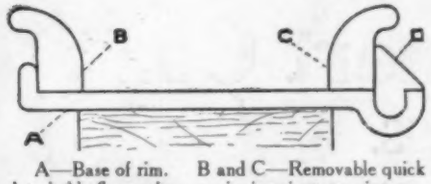
The Tires of "Sterling Quality" for All Standard Rims

QUICK DETACHABLE — Will fit all standard detachable rims

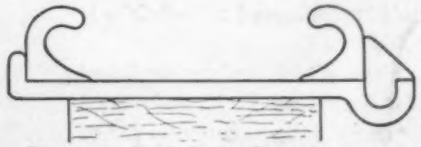
DETACHABLE CLINCHER

STANDARD CLINCHER — Will fit all clincher rims

Any of these tires or any other standard detachable or clincher tires may be used on the SAFETY UNIVERSAL RIM which possesses the three following features:



A—Base of rim. B and C—Removable quick detachable flange rings equipping rim to receive any standard cable base tire. D—Split locking ring.

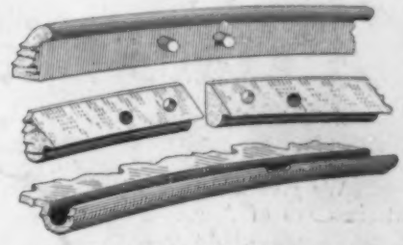


Rim equipped with clincher flange rings to receive any clincher tire.

Complete Interchangeability

Absolute Safety

Always Quickly Manipulated



Removable flange ring, showing tapering dowel pins.

Ends of split locking ring, showing holes which engage the dowel pins and prevent ring from opening out.

Groove in rim into which locking ring fits.

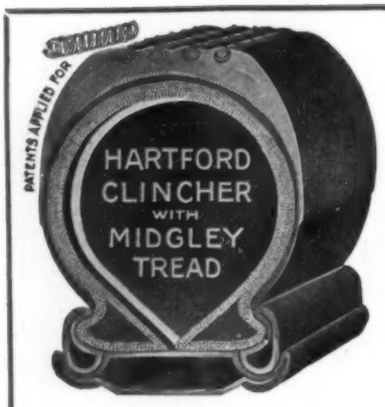
The parts are held rigidly in place by a spreade on valve stem, controlled by a locking nut.

For full information on this Rim, our complete line of Pneumatic Tires, the new Dismountable Rim, Dual Tread, etc., etc., see catalog just issued. Sent free upon request.

The largest exclusive rubber tire makers in America

FIRESTONE TIRE & RUBBER CO., Akron, Ohio

NEW YORK, BOSTON, PHILADELPHIA, CHICAGO, ST. LOUIS, DETROIT, BUFFALO, PITTSBURG



Safeguarded by the Midgley Tread

the new, effective, non-skid device built right in the tire

Your car is equipped for regular or emergency service as it could not be equipped in any other way.

By a simple reversal, the detachable ring of the Midgley Universal Rim will take either a Dunlop or Clincher Tire of corresponding size.

Let us send you special booklet telling all about it, including "Clinchers" in "millimeter sizes," for the perfect fitting of rims on all types of foreign cars. Or call at any branch or agency for inspection and a demonstration.

The HARTFORD RUBBER WORKS CO.

HARTFORD, CONN., U. S. A.

NEW YORK: 88 Chambers St. and 1769 Broadway
CHICAGO: 83 Michigan Ave.
BOSTON: 494 Atlantic Ave. and 100 Boylston St.
PHILADELPHIA: 138 North 10th St.
BUFFALO: 725 Main St.
CLEVELAND: 1831 Euclid Ave.
DETROIT: 256 Jefferson Ave.
DENVER: 1564 Broadway
LOS ANGELES: 380 S. Los Angeles St.
SAN FRANCISCO 423-433 Golden Gate Ave.

As an illustration to show the diversity of the production of—

The Biddle & Smart Co.

AMESBURY, MASS.

We give a record of seven car-loads of Automobile Wood-work shipped from our factory during the last six days of April.

First car-load Top Runabout Bodies and Limousines, completely upholstered and finished.

Second, 100 sets body stock to be used in building metal bodies.

Third, Fourth, Fifth and Sixth, car-loads of Touring Car bodies, all completely upholstered and painted.

Seventh, Touring Car Bodies, in the White, for Machines selling for $4,500.00.

Above production was completed entirely in our own plant, under one management, and for one profit; an actual statement of facts which should be of decided interest to Automobile Manufacturers who require deliveries, quality and quantity.

Incidentally, the shipment for the month consisted of fifteen separate car-loads in addition to a large number of local deliveries.

The Biddle & Smart Co.

AMESBURY, MASS.

Manufacturers of Automobile Bodies of every description

LIBRARY of CONGRESS
Two Copies Received
JUN 15 1907
Copyright Entry
Feb. 4. 1907
CLASS A XXc., No.
138243
COPY B.

VOL. XVI. NEW YORK—THURSDAY, JUNE 13, 1907—CHICAGO No. 24

THE AUTOMOBILE

LOZIER WHICH GETS THE CUP IS TO BE SEEN IN THE FOREGROUND.

THERE were no ties in the 208-mile endurance run of the New York Motor Club. Judging from similar events which I have seen in France and Britain, this one-day contest from New York City to Albany via the Berkshires was the most strenuous thing of the kind that has been asked of the automobile since it appeared on the scene. The route embraced roads of all degrees, excellent, good, indifferent, and wholly bad; level stretches, and hills to climb and hills to descend, and, for a good share of Thursday, June 6, the rain descended upon the just and the unjust and the automobilists.

At the conclusion of the long, hard day, the one which survived with less points charged against it was a sturdy four-cylinder air-cooled Corbin, driven by John Dower; but, alas for its claim on the touring car class cup, it had come the latter part of the journey with one passenger less than the rules called for. Therefore, it was the ponderous Lozier, with H. Michener at the wheel, which profited by the non-observance of the conditions.

In the runabout division the most consistent performer turned up in the Haynes, guided by C. B. Warren, and next best was Richard Newton's Stoddard-Dayton.

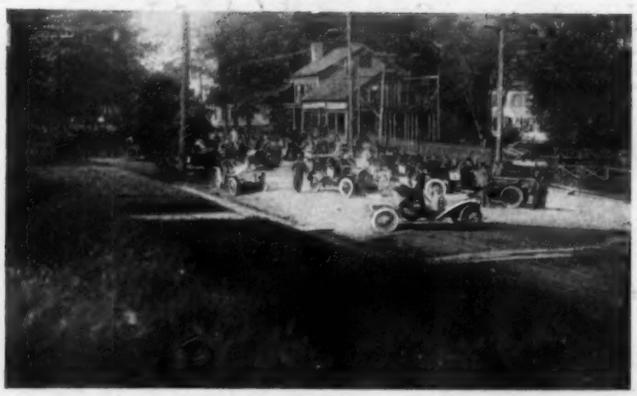
Considering the roads and the weather, and the extraordinary conditions that existed, the score of the day reflected to the rare ability of the automobiles participating, for 13 of 17 touring cars and 4 of 10 runabouts completed the trying trip; not to forget a half-dozen free lance official and press cars which reached the Ten Eyck in Albany before midnight.

Twenty-seven candidates in all responded for the fray and reported to Chairman R. H. Johnston—who deserves great credit for his masterly handling of the affair—and at 6 o'clock from the corner of Broadway and Sixty-second street the first car, a Frayer-Miller, took the word from Starter Wagner and Timer Dieges. A minute apart they were sent away, and in their wake followed the Berliet press car, of which I was one of the six occupants.

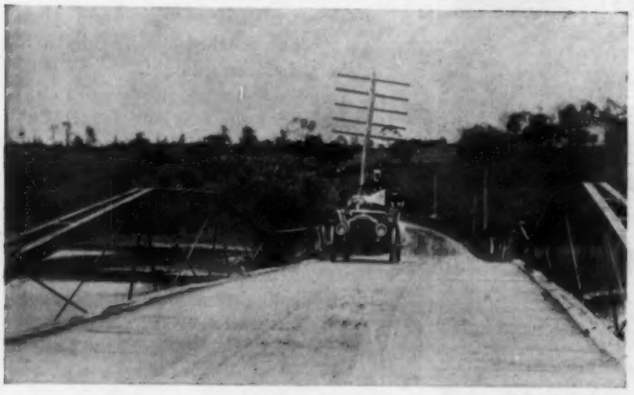
We thought we were law-abiding, but just as we tried to leave the outskirts of Yonkers there flashed past us on the deserted roadway—unoccupied except by ourselves—a "bike cop," who haled us back to a station-house a mile or more away. Sergeant Cooley was gruff but sensible, and over the telephone Judge Beale recognized the technical character of the arrest. But when we took to the road again we were hopelessly in the rear and remained so nearly all day.

For twenty miles there was nothing, except the two official flags, to indicate an endurance test. The roads were muddy—

CORBIN "NO. 24," WHICH WON YET LOST THROUGH NOT RETAINING FOUR PASSENGERS.



EVERY CAR REPORTED AT THE TARRYTOWN CONTROL.



ROBBINS AND AEROCAR WHICH REACHED SIX CONTROLS ON TIME

TIRE TROUBLES NUMEROUS BECAUSE OF ROAD CONDITIONS.

WELCH, HAYNES, AND POPE-HARTFORD AT COLD SPRING, N. Y.

but they are often muddy in the neighborhood of Paris—and would surely improve when the vehicular traffic of the great city had been thoroughly shaken off.

Tarrytown hove in sight, there was a passing word with the checker, and the Berliet continued its regular easy, forward march through mud and rain.

Cold Spring, the second checking station, failed to bring any sight of the contestants, and it was somewhere in the neighborhood of Poughkeepsie that the rear guard was first overhauled. Continental was having trouble with tires, Frayer-Miller had a similar malady, and Dragon, Stearns, and Franklin were observed in difficulties of a like nature.

At Poughkeepsie, where, being non-contestants, it was possible to spend a few minutes to supplement the morning sandwich with more substantial refreshment, news was available of the group ahead of us. Maxwell had retired to the hotel garage to repair a cracked frame, and sent out a bulletin that she would soon be strengthened up and on the road again. Glide had slipped out for some unknown reason. Franklin was working furiously on tires—detachables, fortunately. Dragon, Stearns, and Continental came and left while we were waiting.

Outside Poughkeepsie there is a highway—highway is employed euphonistically—that no adjective in Webster's dictionary adequately describes. Had it not been so wet it might have been described as a plowed field; the only comparison which could be brought to mind was an oozy harbor, in a small town of boyish memories, which ran dry at low tides. The harbor bed, however, had a comparatively smooth surface; the Poughkeepsie road, on the other hand, was furrowed in a thousand lines, which held the wheels in a firm grip and prevented any deviation for the greasy path of rectitude. Fifteen yards ahead was the Continental, with a pressman-observer occasionally on its rumble seat. From left to right, and from right to left, the five in the tonneau of the Berliet bumped and jostled one another, soared upwards from one to twelve inches, and came down with pains varying from the minute to the acute. Not even the satisfaction of a unique experience was ours, for if some day in the chauffeurs' cafés on the Avenue de la Grande-Armée we dare to relate that a bunch of American machines traveled at over twenty miles an hour over roads compared with which the artillery drill ground in winter is a boulevard, we should be unceremoniously hooted out.

Little by little the belief that the Motor Club Committee had chosen a few of the least traveled tracks of the country as a special test of the machines began to slide away. They might have chosen fifteen or twenty miles of rocky riding; they might even have found thirty miles of it, but to believe that they would deliberately select the whole course over by-paths was impossible to believe. These must be the American roads we often read about in European journals, and around which returned travelers delighted to weave fancy flights of the imagination—invariably received with the remark *blague* and *bluff américain*.

At Great Barrington, 134 of the 200 odd miles, Pope-Toledo, Glide and Maxwell were the only three having disappeared from the mad mud run. Welch, Haynes, Aerocar, Corbin and Reo had perfect scores, at any rate so far as time on schedule was concerned. An average of about twenty miles an hour on such road conditions, where the engine plowed the machine through the most persistent mud it is possible to imagine, and where speed had to be kept very low in the occasional spots where speed was possible, owing to the operation of traps, is a performance of more than ordinary worth.

After lunch a readjustment of weight was made, the writer being transferred from Berliet press car to Berliet patrol car, the driver of which latter had no intention of remaining long in the rear. At the risk of being considered a dissatisfied gruntler, one more mention must be made of the lack of roads. It was outside Lenox, splendid country, magnificent residences, every indication of material comfort, but between the two widely separated hedges a miry, slimy mass of the consistency of carpen-

ters' glue, rather more liquid and a little darker in color than the mother earth in the adjoining fields. On low gear and with wide open throttle the Berliet plunged into it as she had been doing for the previous six or seven hours. The running boards were under, the gasoline tank was reposing on the soft, greasy bed, half the radiator was choked with mud, the rear wheels spun round, and the car remained as immovable as a rock. Only when all passengers had been disembarked and the engine raced until its water was boiling could traction be obtained. When the spot was passed somebody discovered that the confetti car had passed over the footpath.

There was another similar experience after some delightful scenery in the Berkshires, when the Berliet struck a short, stiff grade with bottomless mud, a few miles from Chatham. Again she was lightened, this time of only half her crew, given a supply of water inside and outside the radiator, and rushed to the top. On the good portions—the good portions in this case being the stretches of road with an under surface covered with an average of not more than four inches of mud—there was exciting going. With a splash the front wheels would strike a muddy lake, throwing the brown fluid right and left with much the same effect as a motor boat taking a sea at high speed. Despite the wind shield, much of it came inboard, completely disguising the more exposed occupants at the end of a few miles. When one car passed another, a rather rare occurrence, the crew of the slower machine had to duck to avoid a shower.

Grade Crossings Caused Anxiety Throughout.

Few stops were observable for mechanical troubles. Tire annoyances were plentiful. Early in the day the Frayer-Miller was begging inner tubes from passers-by, the Franklin filled its tires with punctured tubes instead of air, and quite a number reported their fifth or sixth blow-out. Our own came soon after Valatie, while running for Albany in the dark. Almost at the same spot lay Franklin, abandoned, with rear axle disabled as result of running on flat tires. Further ahead lay the remains of the Corbin No. 2, whose sad accident was the only blot on an otherwise perfect tour. An entirely unprotected crossing—the Railroad Commissioners say it is one of the worst in New York State—the only wonder is that accidents of this nature are not more frequent; until the railroad companies are under the same obligations as other users of the highways, it is to be feared that other occurrences of this nature will have to be recorded. It was saddening news to learn of the death of poor Clarence McKenzie, a fatality that came so close to the end of the hard run.

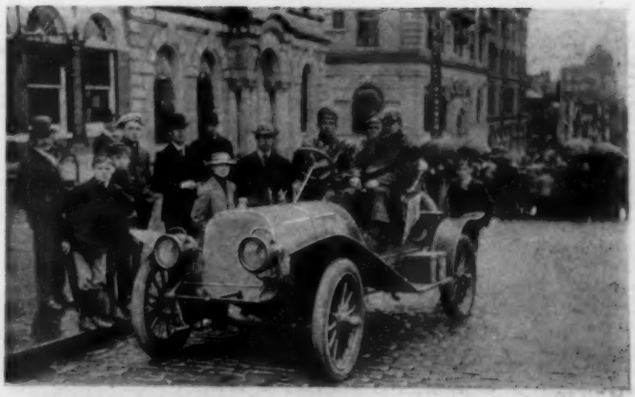
Limping on three tires, the punctured pneumatic having come off en route, the Berliet checked in at Hotel Ten Eyck at a late hour. There was not a clean score, nor a clean traveler, among the 27 starters, but there were numerous exhibitions of mechanical endurance and human dash and skill of the superlative degree.

Summarized, the result of the New York Motor Club's 200-mile, one-day run is to be found in the table below. Controls were at Tarrytown (23 miles), Cold Spring (52), Poughkeepsie (75), Amenia (102), Great Barrington (134), Pittsfield (155), Chatham (183), and Albany (208).

For checking purposes each section of the route was considered independently, whatever their position, all cars starting out from controls free of penalty for that section. One point per minute for late arrival at controls, and two points a minute for repairs and adjustments, or early arrival, constituted the penalty list. Class A comprised full touring cars with not less than four passengers, and Class B included runabouts with either two or three passengers.

THE OFFICIAL REPORT OF THE COMMITTEE.

The Endurance Run Committee consisted of R. H. Johnston, chairman; S. B. Stevens, Jr., A. G. Batchelder, Alfred Reeves.

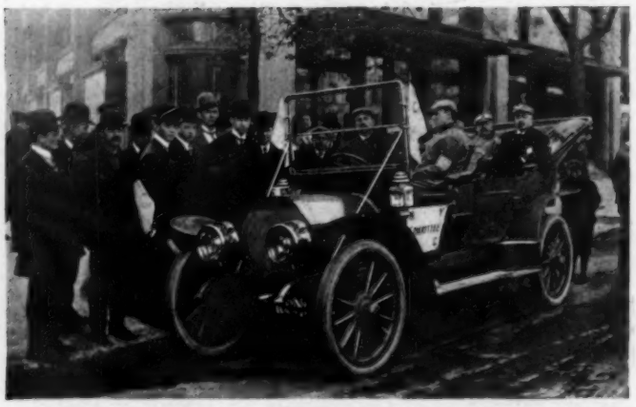


HAYNES, WINNER OF RUNABOUT CLASS, ON ARRIVAL IN ALBANY.

WHITE TACKLES A BERKSHIRE ROAD IN PROCESS OF REPAIR.

LAKEVILLE, CONN., WAS HAZY IN THE FALLING RAIN.

OFTEN ROADS WERE GREASY AND SKIDDING UNPOPULAR.



BERLIET "PRESS" CAR CAPTURED BY A YONKERS "COP."

"The award of the prize in the touring car class is made to No. 9 Lozier. The award of the prize in the runabout class is made to No. 11 Haynes.

"The observers' cards show that no adjustments, repairs or replacements were made to the following cars:

"No. 1 Frayer-Miller, No. 8 Continental, No. 9 Lozier, No. 11 Haynes, No. 12 Pope-Hartford, No. 14 Berliet, No. 24 Corbin and No. 26 Stoddard-Dayton.

"The remaining cars which finished received only minor penalties, which, it is reasonable to assume, might not have been necessary under normal touring conditions."

HERKOMER WON BY LADENBURG OF MUNICH.

FRANKFORT, GERMANY, June 11.—This year's Herkomer Tour, which has been on since June 5, was completed to-day, a Munich entrant by the name of Ladenburg being declared the winner. Out of the 161 starters, no less than 110 went the entire distance in good shape. The start was from Dresden around an 1,800-kilometer circuit, with the finish at Frankfort, and the event was purely an endurance run.

TABLE SHOWING ARRIVALS AT ALL CONTROLS AND OFFICIAL POSITIONS.—A. TOURING CAR CLASS.

No.	Car	Driver	Entrant	Tarrytown	Cold Spring	Poughkeepsie	Amenia	Gt. Barrington	Pittsfield	Chatham	Albany	Total
24	Corbin	John Dower	Corbin M. V. Co.	0	0	0	0	5	0	4	0	9
9	Lozier	H. Michener	H. A. Lozier	0	0	0	0	4	0	1	13	18
10	Welch	E. L. De Camp	L. H. Perlman	0	0	0	0	0	4	15	5	24
30	Reo	B. L. Lockwood	R. M. Owen & Co.	0	0	0	0	0	0	17	29	46
14	Berliet	P. J. Johnson	A. Locomotive Co.	0	2	0	0	0	21	19	37	79
25	Mitchell	E. W. Hudson	Mitchell Motor Co.	0	0	10	10	8	2	38	35	103
29	Corbin	Jim Corbett	Corbin M. V. Co.	0	0	0	8	10	4	45	49	116
12	Pope-Hartford	Phil Hines	A. G. Southwerth Co.	0	0	0	33	0	0	12	86	131
28	Darracq	S. H. Shaw	S. B. Stevens	0	12	2	34	12	8	40	42	150
27	Dragon	A. L. Kull	A. L. Kull Auto Co.	0	0	50	0	0	19	30	20	153
5	Knox	H. M. Davis	Knox Auto Co.	0	0	0	8	0	19	58	137	222
21	White	R. B. Mann	White Steamer Co.	0	0	0	0	99	10	57	63	229
1	Frayer-Miller	H. H. Knepper	H. H. Knepper	0	0	1	108	59	6*	24	102	300
15	Pope-Toledo	Joe Judge	A. G. Southworth Co.	0	0	0	0	Out				
18	Glide	J. C. McCafferty	Geo. J. Scott Co.	0	0	Out						
22	Aerocar	A. M. Robbins	A. M. Robbins	0	0	0	0	0	0	34	Out	
23	Maxwell	Chas. Flemming	Maxwell-Briscoe Co.	0	5	24	Out					

*Arrived ahead of time.

TABLE SHOWING ARRIVALS AT ALL CONTROLS AND OFFICIAL POSITIONS.—B. RUNABOUT CLASS.

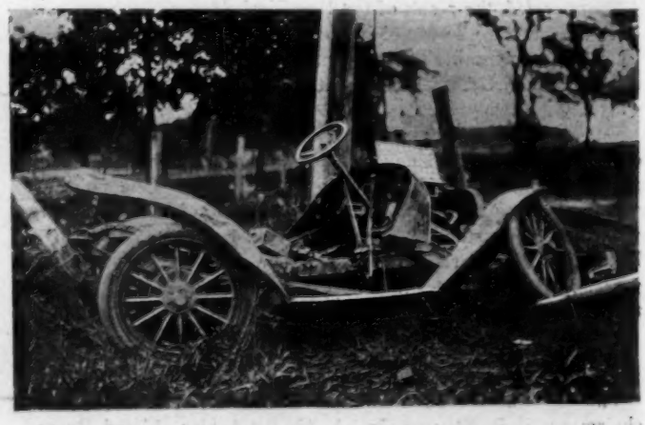
No.	Car	Driver	Entrant	Tarrytown	Cold Spring	Poughkeepsie	Amenia	Gt. Barrington	Pittsfield	Chatham	Albany	Total
11	Haynes	C. B. Warren	C. B. Warren	0	0	0	0	0	0	18	1	20
26	Stoddard-Dayton	R. Newton	Atlantic Motor Co.	0	0	4	0	0	2	26	18	50
17	Premier	C. C. Singer	R. M. Owen & Co.	0	0	8	24	0	20*	0	54	106
8	Continental	C. S. Johnston	C. S. Johnston	0	0	83	0	16*	10	44	37	182
16	Stearns	W. I. Fickling	W. I. Fickling	0	0	46	0	40*	34*	31	56	106
3	Dragon	John Haynes	John Haynes	0	0	0	22	46	49	Out		
4	Stoddard-Dayton	Ray Howard	B. F. Dawson	0	0	0	24	5	Out			
6	Mora	F. Cimiotti	Cimiotti Brothers	0	0	6	11	19	Out			
19	Franklin	R. G. Howell	Wyckoff, Church & P.	0	5	9	49	18	0	14	Out	
2	Corbin	James Swan	Corbin M. V. Co.	0	0	0	0	0	0	16	Out	

*Arrived ahead of time.

and W. J. Morgan. Monday night it completed the report of the run, and the following is included:

"In reference to the protest filed by the Welch Motor Car Company against Corbin No. 24, the committee find that the Corbin carried but three passengers from Great Barrington to Albany. The committee realize that there were extenuating circumstances in reference to the dropping of the original passengers and to proceeding thereafter with but three. Nevertheless, despite the fact that the Corbin finished with the least penalization, the committee have no other alternative than to declare it ineligible for the first prize. The protest entered by the Welch Motor Car Company against No. 9 Lozier has been withdrawn.

"The committee has also seen in the newspapers what purports to be a protest from A. G. Southworth. As no such communication, with the requisite fee of $10, has been received by the committee, it would not have been necessary to take any cognizance of same, except that it implies that the committee was not fair to No. 12 Pope-Hartford. In answer to this allegation it is only necessary to point out that had the car in question adhered to its schedule it would have been due at Albany at 6:11. As a matter of fact, it did not arrive until 8:22, which obviously and unquestionably entailed a penalty of 131 points, as the most superficial examination of the rules would show.



GRADE CROSSINGS ARE A MENACE TO AUTOMOBILES.

WEATHER SPOILS BRITISH TOURIST TROPHY RACE

By JOSEPH F. MACKLE.

DOUGLAS, Isle of Man, May 31.—The patriotic autoist has another cause to rejoice, for now a third time an all-British car has carried off the Tourist Trophy. Success this year has rewarded the Rover, the production of the old Coventry bicycle firm, which now achieves its first victory in automobile racing. Second place has fallen to the Beeston Humber car, while

CURTISS IN WINNING ROVER ROUNDING WILLASTON CORNER.

no third competitor managed to finish the course. Such a statement must seem disappointing; in reality it is the weather and not the cars that must be held responsible.

Altogether 31 entries were made for the race compared with 43 last year, and even this small list was much reduced by withdrawals. Rolls found himself unable to defend his position as holder of the trophy and no less than six other cars were not completed in time. Of these the greatest disappointment was created by the absence of the new British-built Mercedes, which was to make its first appearance at the race. The remainder, small as it was, looked likely to be further reduced by some bad smashes which occurred during practice, but luckily replacements were effected in time and no further retirements were rendered necessary.

The principal condition of the race limited the fuel allowance to a gallon of gasoline for every 25 miles of road. This is, of course, the fundamental idea of the Tourist Trophy races and that it is a suitable method of preventing unduly high engine power without limiting too much the scope of the designers is seen in the adoption of this same principle in the Grand Prix race. Further latitude was this year allowed by the abolition of chassis weight limits, but an increase of the total load from 1,200 to 1,400 pounds has made the task somewhat more difficult. This load was in many cases made up by the use of cast-iron floor boards and by nailing sheet lead to the tonneau seats, and in view of the big dead weight it was significant to note that spare springs were being carried on many of the vehicles.

How the Contestants Were Examined.

The cars were assembled at the enclosure on Tuesday morning and much interest was aroused when the closing hour arrived, in view of last year's fiasco, when no less than six cars were disqualified through arriving a couple of minutes too late. Promptly at 10 o'clock the gates were closed, and almost immediately the Leader car—false to its name—came gently down the road. As this was the lowest powered car in the contest, some unkind persons suggest that the disqualification was intentionally gained. Inside the enclosure the cars were marshaled into line and, with observers on board, the procession led off to Quarter Bridge, where a level half mile had been marked off for the slow run on top gear. All successfully covered the distance at less than the specified twelve miles an hour, but the spasmodic jerking of some of the cars clearly showed the lack of flexibility of a high geared high compression engine, with a carbureter finely adjusted for economical running. The other gearing test consisted of a stop and start on a 1 in 6 grade, but this was quickly disposed of without any trouble. Back at the enclosure the technical committee officials set themselves to the monotonous task of weighing up the cars and ballast, and seeing that the many and unnecessary regulations covering the body and chassis dimensions had been carried out.

Actual Stock Cars Mostly Utilized.

Observation of the cars ranked in long line in the tents revealed that the freak type of car was much less in evidence than at previous events. In many cases actual stock cars were utilized, with, of course, specially tuned up carbureter and higher gearing. The remainder had been specially built for the event, but were on the maker's standard lines and easily recognizable. The engines showed a tendency towards long strokes, and at the same time the compression had been raised to the highest possible figure. Carbureters seemed to afford the biggest scope for individual effort, and in nearly every case some special arrangement was incorporated in the design. Almost always the automatic air device was replaced or assisted by a hand-operated extra air inlet, and the new Gillet-Lehmann carbureter controller was found on five cars, the opinion of these drivers being that the device showed good saving.

The transmission gear was mostly devoid of novelties of construction. The direct drive on third speed and indirect fourth has naturally retained its popularity in an event where so much downhill rushing is required, but in one case, the Hillman-Coatalen car, this practice has been adopted with three speeds, the direct second giving up to forty miles an hour and being normally in use while on favorable grades, the indirect third taking it to

HUMBER (READ) AT BOTTOM OF KIRK MICHAEL DIP.

MILLS IN BEESTON-HUMBER LEAVING HILLBRON.

J. P. HUTTON IN HIS BERLIET GOING WELL.

almost seventy miles an hour. This is well worth consideration for touring car work in view of the saving in length and complication in the gear box. As might be expected from the comparatively low power of the engines, shaft drive easily comes first in favor, side chains having but few adherents.

Wire Wheels Much in Evidence.

Perhaps the most interesting tendency to be noted is the general use of the wire wheel, fourteen cars out of twenty-two having adopted this practice. There can be no doubt as to the superiority of the wire spoke wheel for racing purposes and the absence of serious accident in spite of the constant serious side slips during the race must in great measure be due to the big lateral strength of this type of wheels. The majority of the wire wheels were of the detachable type just introduced by the Rudge Whitworth firm, a spare wheel complete with tire being put on inside of one minute. The few cars with wooden wheels had all removable rims. The examination and weighing in was not completed until Wednesday afternoon, and the measuring out of the allotted quantity of fuel had to be rushed through in order to finish before daylight failed.

Began in a Steady Downpour of Rain.

All previous racing events in the island have been favored with the best of weather, but at an early hour yesterday morning the weather conditions indicated a big change. A steady downpour of rain greeted the commencement of operations at 8 A.M., at which hour the cars were drawn out by horse to the adjoining hill leading down to the course. The roads were reported to be in such a greasy condition that the officials quickly decided to allow non-skid tires to be used, and this concession was quickly taken advantage of. This process delayed the start till well after the appointed hour, and it was close to half past nine when A. Lee Guiness received the word to go.

The red Darracq glided gently down the hill, with clutch out till the main course was reached a hundred yards away; then, with a roar the engine sprang into life and the car was off on its journey of six circuits of the 40-mile course. Almost immediately followed the second Darracq, with K. Lee Guiness at the wheel—the younger brother of the well-known Darracq racing driver. At half-minute intervals the word was given, and silently the cars went away, the scene affording a most pleasant contrast to the usual smoke and noise of a racing event start.

After the 22 Tourist Trophy cars had departed without incident, the nine heavies for the other event were sent away—looking unwieldy monsters with their big wind shields—and sadly the body of officials and pressmen tramped through the mire to the official enclosure, where round the timekeepers' box and the big scoring sheets a considerable body of spectators were gathered together. In but a short time the telephone station on the top of Snaefell mountain reported that the Hillman-Coatalen car was passing, the additional and cheerful announcement being made that the fog on the mountain had risen to such an extent that the cars could hardly be seen and that fast work was rendered impossible for more reasons than one.

Soon Coatalen rushed past the enclosure, having completed his first round in 1 hour 4 minutes, the fastest time of the day. As this car had clearly passed nineteen competitors on the road, its chances were looked upon as excellent, but unfortunately the driver took the sharp turn at Quarter Bridge at an excessive speed and ran into the curb stone, bursting a tire and breaking a rear spring. A quick repair was effected in less than ten minutes and the second round was covered in fast time, but the spring broke again and the popular driver had to retire.

Times Were Slow on Account of Rain.

Meanwhile the other cars were coming through at scattered intervals, but, as was only to be expected on account of the rain and the fog, the times were comparatively slow. Coatalen's time equaled 37 1-2 miles an hour, while the next best time was made by the Beeston Humber, doing 1 hour 13 minutes, or 33 miles per hour.

Hutton's Berliet had the misfortune to break a gear wheel at Peel, and this unlucky driver was so much delayed that he was hopelessly out of the running. The rain came down unceasingly all the while, and already it was clear that the race was not going to be a success from the spectacular point of view.

The Quarter Bridge corner, which proved the undoing of Coatalen, was also responsible for the only serious accident of the day. The Star car, on the second round, skidded into the wall and seriously hurt the mechanic.

The times for the second round showed that the Arrol-Johnston, driven by Napier, the Trophy's first holder, was at the head, closely followed by the Beeston Humber and the Metallurgique.

The same order was maintained till the fourth circuit, when news of retirements came gradually to headquarters. Both Berliets were out of the race, the extraordinary reason being given that the gear boxes were full of mud. The Darracq of the younger Guiness broke its differential as the result of a bad skid at Ramsey, and the Coventry Humber, the most powerful car in the race, dashed straight into a house at Kirkmichel—hardly half a mile from its garage. Some excitement began to be shown now that the race was nearing its close.

At the end of the fifth round the five first cars were within seven minutes of the leader, and as the wet atmosphere was playing havoc with the fuel consumption, grave doubts were expressed that any car would be able to finish the course. The Metallurgique kept well ahead, and soon the message came through that it had passed Snaefell summit and had but the eight miles of down grade to cover. Two minutes later the Darracq of A. Lee Guiness passed the same station, while the Rover and Beeston Humber were still climbing up from Ramsey several miles behind.

And Then Came the Trophy Winner.

Minutes passed slowly at the finishing line, and no car came in sight. A quarter of an hour, and word was passed along by the signallers on the course that the Darracq was stopped for want of gasoline but two miles from the post. Other cars were

meanwhile finishing their fifth round, and as each came into sight great excitement prevailed when the whistle blew.

Suddenly "No. 22" was announced, and, with a wild swerve Curtiss brought his Rover to a standstill, victorious in his third essay for the Trophy. The winner reported the Metallurgique stopped for gasoline almost alongside the unfortunate Darracq, both having thus been robbed of victory when almost at the end of their journey.

The Beeston Humber came through a few minutes after the Rover, and took second place. Trouble with a wet magneto had delayed the car over 20 minutes in the last two rounds, otherwise the final placing would probably have been reversed. In this connection it is interesting to note that the Humber was one of the few cars which was not equipped with a second ignition system—a provision which would have obviated the fatal delay.

The time for the Rover was given as 8 hours 23 minutes, an average of close on 29 miles per hour. While this performance does not approach the 40-mile-an-hour gait of Rolls last year, nor the Arrol-Johnston 33-mile-an-hour average of the first race, it must be regarded as highly satisfactory in view of the thick fog on the mountain, which at times rendered it impossible for the drivers to see ten yards ahead.

The winning car ran most consistently throughout, and did not vary more than a minute on successive rounds. The car has 4-cylinder engine, 90-inch bore by 110 mm. stroke, with four speeds and live axle.

HOW THE HEAVY TOURIST TROPHY WAS WON.

While the Tourist Trophy of this and previous years has successfully catered for the car of from 16 to 24 horsepower, cars of higher power than this have been left without an event of sufficient competitive importance to stimulate the activities of makers. The institution of the Heavy Touring Car race was the outcome of this demand, and it was intended to include cars of power ranging up to 35 horsepower. The fuel-limitation principle of the Tourist Trophy race was retained, the allowance being fixed at one gallon of standard gasoline for every sixteen miles of the course. Owing, no doubt, to the late announcement of the race, the number of entries did not exceed sixteen, and of these seven were withdrawn.

The distance of the race was originally fixed at seven circuits of the course, or 281 miles, but it was later reduced by two circuits. On the morning of the race the officials suddenly decided to allow an extra one and a half gallons of gasoline in view of the heavy nature of the roads and the big wind, so that the allowance reached one gallon for every fourteen miles. The nine competitors consisted of a Cornilleau-St. Beuve, Berliet, Thorneycroft, Arrol-Johnston, Gladiator, two Ariels and two Beeston Humbers—an almost "all-British" representation.

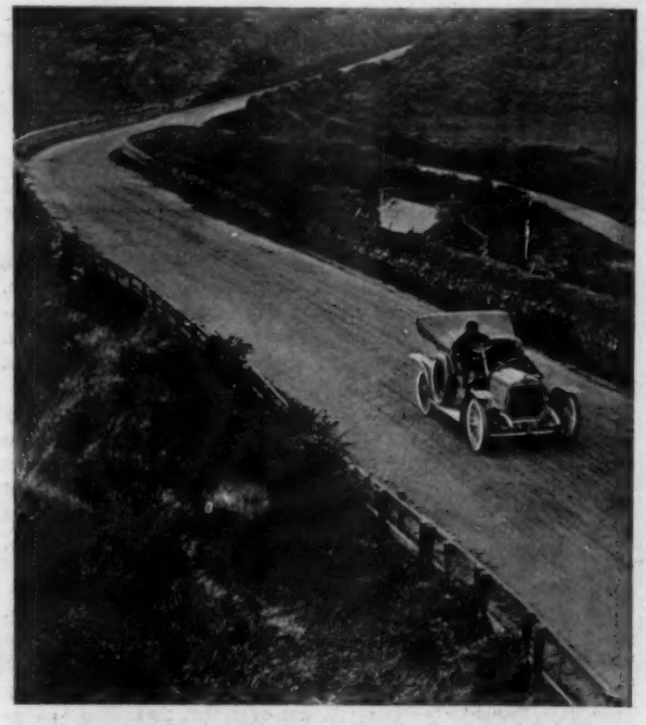
After the Tourist Trophy cars had been got away, the nine of this heavy class were given the word at half-minute intervals. When but a few miles on his first lap, Arnott had trouble with his Arrol-Johnston and broke a wheel on a dangerous corner. This, strangely enough, was the only trouble experienced in this race, the remaining eight cars running till they finished, or till their fuel gave out. The two Ariels came round first in 1 hour 14 minutes, only seventeen seconds separating the two cars, which ran together very consistently. The big wind resistance can well be gauged by noting that this average speed for 45-horsepower cars—the biggest in the race—only reaches 33 miles an hour. Watson's Berliet came to the front at the close of the second circuit, but this lead was soon lost through tire trouble. Sangster's Ariel was at the head of the procession for the remaining laps and looked a certain winner, but with the worst of misfortune ran out of gasoline but half a mile from the post, twenty minutes ahead of the next car. The only cars to complete the last round were the Beeston Humber, driven by G. P. Mills, and the Gladiator. The Humber's time was 7 hours 11 minutes, or a 28-mile-per-hour average, compared with 7 hours 25 minutes for the Gladiator, and so the Beeston Humber firm carries off the trophy for the first time. It is a matter for comment that the winners in both events are firms who have long been identified with the struggle for supremacy in the British cycle market.

AUTOCYCLE TOURIST TROPHY RACE.

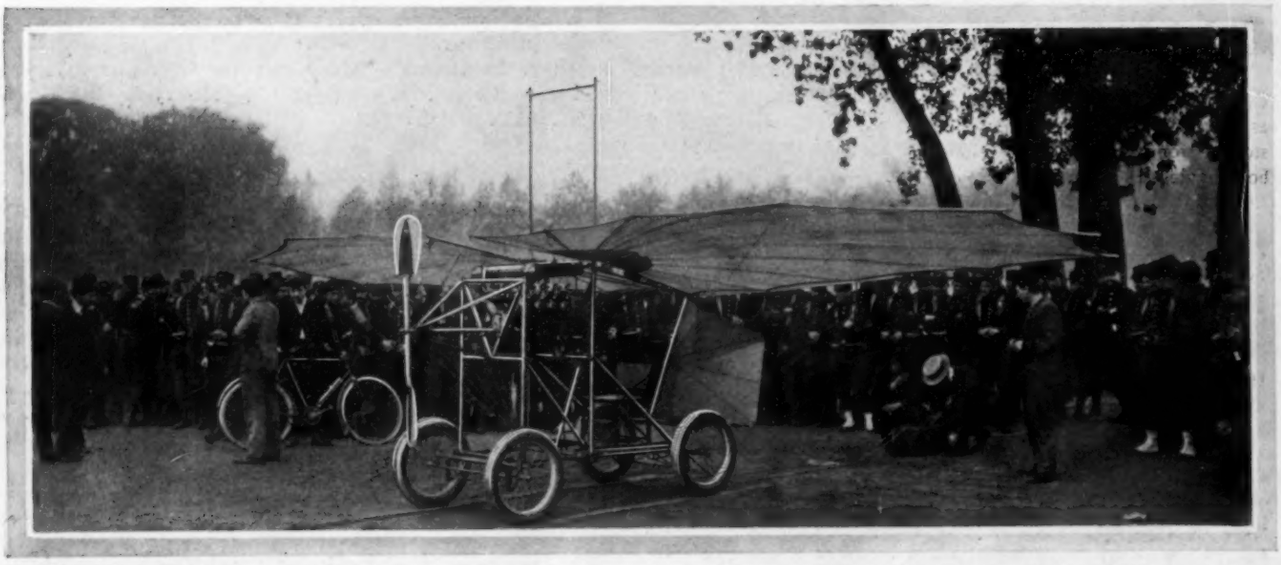
DOUGLAS, May 30.—The first of the annual races intended to be held by the Autocycle Club on the fuel-limitation basis of the Tourist Trophy races, was run off yesterday. Two classes were provided, the single-cylinder section being allowed one gallon of gasoline for every 90 miles, while the multicylinder machines had to cover 75 miles on a like amount. Of the twenty-six entrants in the two classes, but one failed to put in an appearance yesterday morning at the Tynwald Hill. The course covered 15 3-4 miles of hilly ground, so that ten laps gave a total of almost 158 miles to be covered.

At 10 A.M. the machines were started in pairs, the single-cylinder bicycles being rated at 3 to 3 1-2 horsepower, while the engines of the eight machines in the larger section were rated at 5 horsepower.

The favorite was C. R. Collier, on a Matchless machine of 3 1-2 horsepower, and from the start this rider made fast time, averaging 23 1-2 minutes for each lap; close behind came the elder Collier, and till half distance this pair kept at the head of the single-cylinder section. The fifth round ended, each competitor stopped for ten minutes to receive the second half of his gasoline allowance. The leader in the twin-cylinder section had the misfortune to have his machine take fire, and it was disabled. Some half-dozen competitors were retired, mostly through tire troubles. After a fast race, C. R. Collier finished in the good time of 4 hours 8 minutes, an average of 38 1-2 miles an hour over the hilly course. His gasoline consumption equalled 94 1-2 miles per gallon. Two Coventry-built Triumphs finished 15 minutes later, one having only used a gallon for each 115 miles. In the twin section H. Fowler won by 32 minutes in 4 hours 21 minutes, a good performance for an amateur in his first race. Fowler made the fastest lap of the day at an average of 43 miles an hour, which was good going for the course.



20-HORSEPOWER CLEMENT LEAVING PICTURESQUE GLENMOOR.



REMODELED AEROPLANE OF M. VUIA, PARIS, NOW FITTED WITH EIGHT-CYLINDER ANTOINETTE MOTOR DRIVING PROPELLER FORWARD.

AN AMERICAN'S FOREIGN TOURING EXPERIENCES

PARIS, June 9.—Cortlandt Field Bishop, of New York, who has just returned to Paris, had a perilous passage of the Alps in an automobile, by way of the Simplon Pass. He was accompanied by his wife.

"There was nothing on one side but the mountain, and on the other a precipice rising three or four thousand feet, and the slightest slip would have meant death," said he. "The trouble was that the tunnel, built to protect vehicles from avalanches, which naturally would make the more dangerous places safe, was all choked with snow and ice.

"My wife and I, therefore, were forced to go outside the tunnels, where the path was just wide enough to hold the wheels. There were no railings, and the few scattered stones on the edge of the cliff were no great protection. To make matters worse melted snow, which was knee-deep for half a kilometer, made the way perilous. My wife stayed with me in the car all the way.

Advises Americans to Cross Alps Via Simplon.

"The scenery was magnificent. I advise every American touring the Continent to cross the Alps by way of the Simplon Pass. I understand that this week fifty or sixty men are going to clear the tunnels, so that the danger will not be so great. At present the law reads that vehicles crossing the pass must only travel ten kilometers an hour, but this will be changed to fifteen soon, so that the crossing can be made in about three hours. The highest points in the pass are about 2,000 meters. I crossed Simplon June 5, four other automobiles crossing the day before. Last year about 300 made the passage.

"The annoyances of automobiling in Switzerland are very great. In some villages, such as those between Lausanne and Geneva, it is impossible to pass through at any speed without being fined. Annoyances are increasing to such an extent that the French motorists are talking of boycotting Switzerland.

Americans Should Know New German Rules.

"Touring Americans ought to know the new rules in Germany. If they travel with their American papers and arrive at the German border unprepared, it will be necessary to return to New York to have them viséd by the German Consul there. French papers must be viséd in Paris. If you tour Germany for only five days the auto tax is small, but over that there is a big increase. It is also necessary to purchase on entering Germany a large number to hang on the machine, for which is charged from 10f. to 20f., and one has to get a personal license. Added to this is a deposit with the customs officers, and the danger of fines and arrest by gendarmes.

"But in Italy it is just the other way. I have been going to Italy for years, and during my first trip had my head split by a peasant. I now find every one courteous, and don't remember hearing of any one fined. The import tax on benzine has been reduced from 48 centimes a liter to 24, and the roads are continually being improved. There used to be a great lack of road signs, but the Italian Touring Club has put up some 10,000 to 15,000 signs showing the directions. Next to France, Italy is the best place for touring, and there is more to see in Italy for Americans.

France Barred Italy from St. Louis Balloon Race.

"It is now definitely decided that Italy will not be represented in the international balloon race at St. Louis. It is the influence of the French that has brought about this result. This is a big misfortune to America, as the Italian aeronauts are very daring and accomplished. Lahm, who was stricken with typhoid fever and who has been very ill, is rapidly gaining his health, and is coming to Paris this week. Hawley, who is also to enter the cup contest, is expected here to-morrow and will make a number of practice ascents.

"Admiral Sigsbee is all wrong in his estimate of flying machines in time of war. I don't say that at the present time flying machines can absolutely destroy a fleet, although if France gets into war dirigible balloons will play an important part. But I would not now be afraid to sail over Admiral Sigsbee in an airship and dare him to do his worst. Airships are destined absolutely to revolutionize modern warfare, and no navy can be safe from them."

FIRST AUTOMOBILE RACE IN LAND OF CZAR.

Russia has held her first automobile race, from Moscow to St. Petersburg, in which French cars were the exclusive competitors. The course of 645 versts provided very bad going, Duray, who finished first on a Lorraine-Dietrich, being timed in nine hours and twenty minutes. A delay of about half an hour was caused by running over a dog. Champoiseau, who has recently abandoned the motorcycle for racing automobiles, came in second on a C. G. V. machine, two hours later. There were fifteen competitors. The race was held in connection with the first Russian automobile show now being held at St. Petersburg.

SUITABLE MATERIALS FOR AUTOMOBILES*

By ELWOOD HAYNES, of The Haynes Automobile Company.

SINCE the first attempt to build automobiles, in the '90s, experimenters have had difficulty in getting materials suitable for the purpose. Steel of high tensile strength was employed, but the results were ever the same. Lower carbon steels were tried, but they lasted only a few weeks or months and then broke short off. Swedish iron did not break, but when the first hard bump was encountered it took a set, and the wabbling rear wheels indicated what had happened. Finally a steel of moderately low carbon was introduced which gave only fair results, and if the car was driven for any length of time over rough roads this also crystallized and broke off.

One of the First Uses of Nickel Steel.

In 1899 a nickel steel axle was introduced into a machine by Messrs. Haynes & Apperson, and the car made successfully a trip from Kokomo, Ind., to New York, a distance of about 1,000 miles, without serious breakage of any kind. This axle was made by the Bethlehem Steel Co., of Bethlehem, Pa., and, so far as is now known, was the first material of this kind ever introduced into an automobile. Nickel steel was used in the axles of cars of this construction for about five years, and not a single case of breakage occurred during that period. Not only was this steel found to be practically free from crystallization, but it possessed a very high elastic limit—about 70,000 or 80,000 pounds—and a tensile strength of over 100,000 pounds, with an elongation of about 15 or 20 per cent.

Soon afterward nickel steel was introduced into the construction of driving chains, and showed great superiority over those formerly made of ordinary steel. When the sliding gears were first used on the automobile for the purpose of changing the gear ratio between the motor and rear axle, trouble again asserted itself in breakage. In vain were gears made of the best form of tool steel; the ends of the teeth would break off when an attempt was made to throw them suddenly into engagement by means of the shifting levers. Trouble of a very serious nature resulted from this, as pieces of the broken teeth would get into the other gears, thus causing them to break, and sometimes the entire train of gears would be almost ground to pieces on account of the breakage first of one gear and then of another.

Nickel Chrome Steel.

Machinery steel, case hardened, was tried, and, while this gave better results, it was by no means satisfactory. The injury and breakage of sliding gears were taken as a matter of course, and almost every person possessing a car equipped with these gears expected sooner or later to make a number of replacements.

It was finally discovered that an alloy consisting of iron, nickel and chromium possessed most remarkable properties. Not only could the steel be hardened by heating to redness and quenching in oil, but it could be given a considerable amount of toughness at the same time by drawing the temper somewhat after the first hardening. If the steel was properly made and afterward properly treated, it was found to be almost impossible to break one of the teeth in a six-pitch gear by means of a heavy hammer. So successful were these gears that they rendered it possible to run an entire season sometimes without the breakage or serious injury of a single tooth. Front axles, steering knuckles, and other important parts requiring high elasticity were made of this steel in certain cars with very good results.

Alloy Tool Steel.

The greatest difficulty encountered by the manufacturer was in the working of the steel, which was found to be extremely difficult. Fortunately, about the time of its early introduction, a tool steel was discovered which possessed most remarkable properties. This steel consists mainly of an alloy of tungsten, chromium and iron, with but a very small per cent. of carbon. One of the most remarkable properties of this steel is its capability of becoming very hard and tough when quenched from a glowing white heat by dipping into a bath of oil. This method of tempering would ruin ordinary tool steel, but it produces in the tungsten chromium steel a substance which is capable of cutting the hardest forms of nickel steel and nickel chromium steel with comparative ease. While this alloy tool steel is not used in the actual construction of automobiles, it is referred to because its use is essential in the turning and machining of the high-strength alloy steel.

It has been found that the manufacturing and working of nickel chrome steel requires great care, as there seems to be some tendency toward segregation when the steel is in the process of making, which gives rise to hard and soft spots in the finished metal. If an attempt is made to manufacture gears from material of this character, it will be found that some of the teeth are extremely hard while others are just about the right hardness. On the other hand, even if the steel is of uniform composition and texture throughout, it will not stand very great variation of temperature without danger of injury, since it is very sensitive to heat treatment. When properly made and properly treated, however, it is perhaps the most resistent substance yet produced, so far as the resisting of shocks and blows is concerned. It has been found almost impossible to break a tooth from a six-pitch gear made from this material, even with the use of a heavy hammer. This renders it especially suitable for sliding gears which are subjected to the destructive action due to the striking of teeth when forced into mesh while in motion.

The following may be taken as a test of high-quality nickel chrome steel, made by the Krupp Company, of Essen, Germany. It will be noted that much depends upon the treatment of the steel:

Dimensions of Test Bars, 5.91″ Long and 0.59″ Dia.

	Normal	Slightly Hardened	Greater Deg. of Hardness
Elastic limit, lbs. per sq. in.	86,909	148,072	193,589
Tensile strength, lbs. per sq. in.	111,943	155,326	221,325
Elongation, per cent.	14.5	9.1	7.7
Contraction, per cent.	64.0	55.6	46.2

It will be noted from the above tests also that under the hardening treatment the tensile strength rises rapidly, and the same may be said of the elastic limit, rising as it does from 86,909 pounds to 148,072 pounds when slightly hardened, while the tensile strength rises from 111,943 to 155,326. With a greater degree of hardness the elastic limit reaches 193,589 and the tensile strength 221,325. It will be also noted that the elongation gradually diminishes from 14.5 per cent. in the normal steel to 7.7 per cent. in the more highly hardened specimen. The contraction of area also falls from 64 per cent. in the normal to 46.2 per cent. in the highly hardened steel. The contraction of area does not suffer so much as the elongation. The comparatively small loss in contraction of area is a good sign, since it indicates that the texture of the steel has been well preserved under treatment.

Plain nickel steel containing a very small per cent. of carbon is also a good safe material for automobile work. The following may be taken as an example of a mild low carbon nickel steel:

Elastic limit, 65,146; tensile strength, 81,561; elongation, 23.9 per cent.; contraction of area, 71 per cent.

It will also be observed from this that while the elastic limit is quite low as compared with the nickel chrome steel, it is high as compared with ordinary carbon steel, and that the elongation and contraction of area are very high indeed, indicating a very safe material for almost any construction. This material not only pos-

*Paper read before the American Society of Mechanical Engineers at Indianapolis.

sesses these excellent properties, but resists dynamic stress remarkably well—in fact, if the dynamic stresses are not too close to the elastic limit of the steel it will preserve its strength and quality for an indefinite time. The following tests indicate the quality of this material as compared with carbon steel:

Carbon steel, 15,000 vibrations; nickel steel, 34,000,000 vibrations (not broken).

The former shows the carbon steel under combined torsion and vibration, and the latter nickel steel under the same test. It will be observed that whereas the carbon steel withstood only 15,000 vibrations, the nickel steel was not broken under 34,000,000 vibrations.

Vanadium Steel.

Besides the steels already mentioned, there is another which is now attracting considerable attention—namely, that produced by adding a small quantity of vanadium to a nickel steel or chrome steel. Since vanadium has until recently been classed among the very rare elements, it may perhaps be in place to mention a few of its properties. It is prepared from the chlorid V Cl_3, which is reduced by means of a current of hydrogen gas, the chlorid being heated while the reduction is taking place. Simple as this process may seem, it is one of the most difficult known to chemists, and it usually requires three or four days to prepare a fraction of an ounce of the metal by this process. Until quite recently this element and its compounds, owing to their rarity, were very expensive, but we are now assured by the American Vanadium Co. that a sulphid of vanadium has been discovered in an immense quantity in the Andes Mountains of South America, and that they are now prepared to furnish the metal in the form of a ferro alloy, known as ferro-vanadium, in any quantity desired.

This ferro-vanadium contains about 20 per cent. of the latter metal and is readily incorporated with the iron or steel during the melting, either in the open-hearth or crucible process. Mr. J. Kent Smith, who has given the subject of vanadium steel much attention, advocates the open-hearth process as preferable to the crucible process for the making of this steel. This steel possesses most remarkable qualities, notwithstanding the small quantity of vanadium which it contains. One of these is the closeness with which its elastic limit approximates its tensile strength; and, since the former quality is the one in which the greatest dependence is placed, this is a very desirable characteristic. The sharp contraction of area, also a characteristic of this steel, together with the silky fracture it usually presents, is also a strong indication of the splendid quality of this material. Moreover, the fracture is nearly always of this quality, even though the steel has been highly tempered.

The following are the results of some tests made on oil treated bars of the above steel: It is a rather remarkable fact that the vanadium, alone or with carbon, does not give much character to the iron or steel, but when a third element is introduced, such as nickel or chromium, the characteristics of the steel are changed for the better. Whether the vanadium acts as an essential element in the composition of the steel or principally as a purifier is not fully known; it has been found, however, that a certain amount of the vanadium introduced (about 1-4 per cent.) must remain in the steel in order to give it its characteristic properties. Vanadium, however, has a strong affinity for nitrogen as well as for oxygen, and it may be that it acts as a purifier of the steel by combining with minute quantities of nitrogen gas, which might otherwise be occluded in the steel and thus interfere with its compactness and strength.

It will readily be seen that the high elastic limit, strong contraction of area and splendid silky fracture, together with the large number of vibrations which the steel endures under dynamic stress, most strongly recommend this steel as almost ideal for many parts of the motor car. The writer has made some experiments in the forging, and found that it works well under the hammer, though it must not be allowed to become too cold or it will resist pounding to a remarkable degree. It is not readily injured under the forging hammer, provided due care be taken not to heat it too rapidly. Another valuable property of the steel is the fact that it machines more readily than nickel chrome steel—in fact, more readily than plain nickel steel.

Bronze.

The use of bronzes in the motor car must necessarily be restricted to parts requiring low rigidity, and usually also moderate strength. While it must be admitted that samples of bronzes can be made that approach closely to fairly good grades of steel in tensile strength, elastic limit, and contraction of area, it must also be remembered that the modulus of rigidity of iron and steel is about 28,000,000 pounds, for example, while that of bronze is only about 15,000,000 pounds. This means that a bar of bronze of a given size and form, under given conditions, will deflect nearly twice as much under the same load as a similiar bar of iron or steel. In most parts of the car this feature is objectionable, since changes of alignment are likely to occur, unless the parts which are made of this material are especially well designed.

Notwithstanding the above objection, the readiness with which bronze lends itself to the production of castings of various parts, and its freedom from crystallization under dynamic stress, have led to its introduction into many of the minor parts of the motor car, such as small hand levers, carbureters, tubing, crank cases, gear cases, etc. In general, it may be said that it is suitable for the small levers, such as those used for controlling the sparking mechanism, carbureter, etc. Another use for this metal is in bearings, although these require a decidedly different composition from that used for levers, cranks cases, and like parts.

The parts requiring strength are usually made from nickel bronze, phosphor bronze, manganese bronze, or aluminum bronze, while the bearing bronzes are composed usually of lead, tin, and copper in various proportions. Under this latter head come also the so-called babbitt metals, which vary greatly in their composition, some of them being composed of lead, copper, tin, and antimony, others of lead, tin, zinc, and antimony, and still others of lead, tin, and antimony. It is not the purpose of the writer to discuss the merits of these various bearing metals, since a number of very good ones can readily be obtained on the market.

Besides the above alloys, pure copper is used to a considerable extent in the construction of radiators, gasoline tanks, etc. It is well adapted for the construction of radiators, since it can easily be soldered; is one of the best conductors of heat, and is readily formed into almost any shape on account of its malleability, ductility, and comparative softness.

Aluminum.

Aluminum is now used very largely in automobile construction, and it is a significant fact that it was first introduced into the automobile in America, though the French used it to some extent quite early for a few minor parts of their machines. Pure aluminum is used only for a few special purposes, and even then to a limited extent—most notably for tubing and radiators. It is quite well adapted for the latter purposes in many respects, but the comparative difficulty experienced in soldering it is somewhat of a drawback. On the other hand, when alloyed with copper or some other metal giving it increased hardness and elasticity, it is well adapted for various purposes, such as seats, gear cases, crank cases, dashes, and various other parts of the car. Its extreme lightness, together with the ease with which it may be machined and the facility with which it may be cast, renders it very useful for many parts of the machine.

An alloy of zinc and aluminum seems to have considerable rigidity and elasticity, as well as quite high tensile strength. It is also cheaper than the aluminum-copper alloy, but experiments made by the writer indicate that this alloy is not safe if subjected to repeated vibrations, since it seems to fatigue quite rapidly and sooner or later breaks off short. For example, a 1-2-inch square bar made of an alloy of aluminum and zinc withstood only about 15,000 vibrations before breaking, while an alloy of copper and

aluminum withstood 1,600,000 vibrations of the same aptitude and frequency without breaking or showing any signs of injury except a very slight set. Aluminum also forms a very light alloy with magnesium, which, however, is too expensive for ordinary use and is somewhat difficult to handle in quantity. A number of other alloys of aluminum have been prepared and to some extent used in automobile construction, the most notable, perhaps, of which is an alloy of tungsten and aluminum, which has been used to a considerable extent abroad, but is not used in American cars so far as the writer is aware.

From the foregoing it may be said that the following substances have proved suitable for the various parts of the automobile:

a For rear live axles, nickel steel containing from 4 per cent. to 5 per cent. nickel and less than 0.3 per cent. carbon.

b For front axles, steering knuckles, propeller shafts, etc., vanadium steel.

c For sliding gears, nickel chrome steel hardened throughout, or mild nickel steel case hardened.

d For crank shafts, nickel steel or vanadium steel.

e For frames, low carbon open-hearth steel, mild nickel steel or nickel chrome steel.

f For nearly all other parts of the car, such as hand levers, tubing, etc., a good open-hearth steel of comparatively low carbon—say 0.4 per cent. or under—is of suitable quality, since there is no advantage gained by using high-class steels for these purposes, for the reason that the rigidity of these parts is of prime importance, and in order to make them sufficiently rigid they must be made much more than sufficiently strong; therefore, since all steels are practically equal in rigidity, one steel is, broadly speaking, as good as another for these parts.

The use of bronze should be restricted largely to minor parts; the reducing gear wheels, small levers, etc., can be made of phosphor bronze, while the bearings should be made of some good composition bronze (an alloy of copper, lead, tin, and zinc answers well for this purpose), but the main bearings for the engine, such as the crankshaft, crank pins, etc., should be made of a special bearing metal, which is very firm and at the same time will not injure the crankshaft in case the lubrication becomes deficient. The crank case of the motor, the gear case, and other similar parts may well be made of aluminum, since it is light, strong, and easily cast into the proper shape. Steel would answer for the above parts if it could be conveniently worked into the proper form.

It will be noticed from the foregoing that the most progressive automobile builders have spared neither pains nor expense in obtaining the very best materials that can be produced, because, in order to obtain the highest results in automobile construction, it is necessary that material of superior quality shall be used for certain parts of the machine. Perhaps there is no form of construction that taxes the ingenuity of its builders more severely than the building of a good automobile. Take, for example, one of the high-powered touring cars, carrying from five to seven persons and equipped with a motor of 50 horsepower. Now consider that this motor is sometimes geared down to such an extent that its direct torque is multiplied ten or twelve fold on the rear axle; consider further that the driver of the machine is often entirely inexperienced and, to a large extent, ignorant of the strength of the material and the use of power, and it will be realized that the chances for trouble when driving an automobile are certainly very great.

Now add to the stresses and possible abuses from the foregoing the severe jolting and jarring of the rough roads in America, and some idea may be formed of the severe ordeal through which an automobile must pass during a season's run. It has been the general experience of builders that the more ignorant the owner of the machine the greater his complaint. On the other hand, those who are versed in mechanical matters and who know the sizes of parts generally used for heavy stress, often marvel at the strength and endurance of the modern automobile. Factors of safety must be reduced to the minimum in nearly every part of the machine, or excessive weight is sure to occur. Many high-class machines weigh less than 70 pounds to the horsepower, passengers included. Of course, it is not expected that the motor shall be used constantly at anything near its maximum horsepower. One tenth of its brake horsepower is enough for almost any automobile motor when in daily use. High power is simply intended to meet emergencies; but the material throughout the machine must be strong enough to withstand any stress momentarily applied.

The following table gives approximately the strength of various materials used in automobile construction:

Table 2. Strength of Automobile Materials.

	Modulus of Rigidity	Limit Elastic	Strength Tensile
Aluminum alloys	8 to 11 million	10M to 15M	20M to 30M
Phosphor bronze	12 to 14 million	20,000	30,000
Manganese bronze	15 million	35,000	50,000
Aluminum bronze	15 million	50,000	75,000
Wrought iron	28 million	30,000	40,000
Mild open hearth steel	28 million	40,000	60,000
Tool steel	29 million	80,000	110,000
Nickel steel	28 million	80,000	110,000
Nickel chrome steel	30 million	160,000	180,000
Vanadium steel treated	30 million	220,000	228,000

All of the above materials stand well under dynamic stress, with the exception of the tool steel, which should not be used for this purpose.

OFFICIAL FIGURES ON AMERICAN AUTO PRODUCTION

UNDER the title of Bulletin 66, Bureau of the Census of the Department of Commerce and Labor, a complete statistical review of the automobile and bicycle industries during the years covering the period from 1900 to 1905 has been prepared. This is the most comprehensive work of the kind ever attempted in connection with the automobile industry, showing, as it does, the number of establishments, capital and labor employed, wages paid, average number of operatives, types of cars built and many other items of information never collated previously.

The work is naturally too exhaustive to attempt to review it here, but it is interesting to note among some of its tables the fact that in 1900 the State of Michigan reported no automobile factories, whereas in 1905 it had twenty-two and turned out not far from 10,000 cars in that year. New York, on the other hand, had 15 in 1900 and only 21 in 1905, its production of cars only increasing from 521 to 1,808 in that time.

Another isolated item that is of considerable significance is to be found in the statement that "custom work and repairing amounted to but $73,824 in 1900 and rose to $851,053 in 1905, the amounts representing repair work almost exclusively."

It is further interesting to note the standing of the various states as automobile producing communities, Michigan now being at the head, with Ohio second, New York third, Connecticut fourth, Massachusetts fifth, Wisconsin sixth, and Indiana seventh, this, of course, representing the relative standing in 1905.

The bulletin also contains a great deal of other detailed information, including that covering allied industries and those not devoted entirely to the manufacture of automobiles, showing in a most striking manner not alone the truly tremendous development to which the automobile industry as a separate entity has attained, but likewise the vast increase in the prosperity of a score or more of other branches of trade for which it has been responsible in this country. The statistics cover every possible phase of both the main and allied industries and are of great value.

RECREATIVE READING OF DIAGRAMS*

By L. BAUDRY DE SAUNIER.

THE mere mention of the word diagram is liable to cause the reader to turn away his head; he looks upon it as a closed science, the utility of which has never been proved. Consequently, he fingers the pages and passes on. If I had to tell my reader, at present so uninterested in diagrams, that these curves would

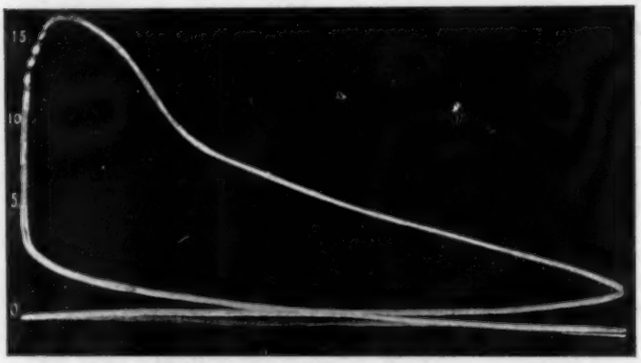


FIG. 1.—Photographed diagram furnished by a four-cylinder motor. Slight depression during intake, good, but slightly retarded explosion; pressure falls rapidly during first quarter of stroke of piston; slight back pressure from muffler during exhaust stroke.

become to him a real recreation; that there are few pictures that would interest him so much (on condition that he lends me his attention for a quarter of an hour), and that he can read these hieroglyphics without any calculation, he will probably think that I am abusing whatever confidence he has in me.

But to come down to our diagrams and the recreation that they are going to give us. The automobile type of motor most usually employed is, as is generally known, a gas engine, the propulsions of its cylinder or cylinders being due to a series of explosions

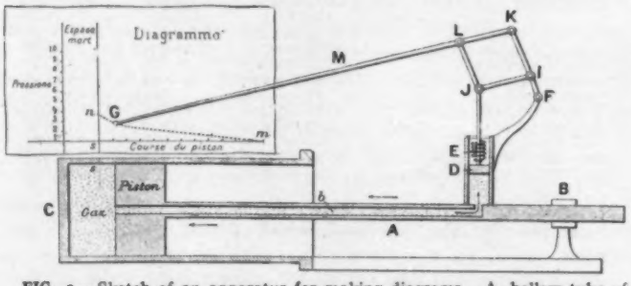


FIG. 2.—Sketch of an apparatus for making diagrams. A, hollow tube of piston; B, guide for piston tube; C, cylinder; D, small cylinder; E, spring; F, articulation of parallelogram I, J, K, L; M, arm with pencil attached; G, pencil; s, s, end of piston stroke; b, pressure tube; m, n, curve indicated during compression stroke.

within a closed chamber. It is known also that the power of a motor depends on a number of factors, the principal of which (bore, stroke and number of revolutions being equal) are the quantity of gas and the weight of it absorbed by each cylinder, the point at which the charge is ignited, etc.

But how can the constructor, or even the amateur, know the exact operation of these factors? If a motor possesses less power than its neighbor, apparently identical with it, how can it be known exactly wherein lies the weakness? The constructor could grope; but would he find the defect? Besides, what certitude has he that the motor is giving all the power of which it is capable? And what is there to tell him where to direct his operations?

He must make the motor speak and tell where it is suffering. True, a motor cannot speak; but at any rate it can write, and write with inconceivable accuracy, telling all that is passing within its cylinders and making known all its secrets.

*Translated from *Omnia* by W. F. Bradley

This property of motors is not of recent origin, since Watt toward the end of the eighteenth century, applied to his machine an apparatus by which he could measure the pressure in the cylinder at any point of the stroke. The apparatus which serves as "writing table" for the internal explosion motor has no resemblance with that used for Watt's slow machine. Inventors had serious difficulties in the search for an apparatus which would resist the brutal shocks of an internal-explosion motor, giving frequently twenty, twenty-five, and more explosions a second, without running wild in this terrible dance.

We will not for the moment at any rate, study the apparatuses designed for taking diagrams of the pressure within our motors; but we will see how they work and try to read together some of the notes drawn up by the motors on which they are fitted.

What we want to know is the pressure of the gas, either fresh or spent, at every moment of the stroke of the piston. This will allow us to modify the general arrangement or regulate parts to obtain the maximum power. If, for instance, we note that during the intake the gas entering the cylinder has a distinctly lower than atmospheric pressure we should conclude either that the valve opening was insufficient or that the piping offered an abnormal resistance to the passage of the mixture.

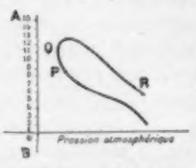


FIG. 3. — Imaginary diagram indicating variations of pressure.

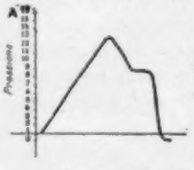


FIG. 4. — Imaginary diagram indicating variations of pressure and depression (below atmospheric).

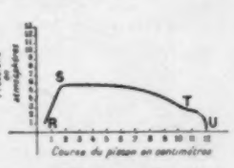


FIG. 5. — Imaginary diagram indicating variations of pressure in relation to positions of piston in cylinder.

If at the moment of ignition we find a low pressure, we conclude either that the mixture is bad or that the ignition is defective. If, when the exhaust takes place, we find that the pressure in the cylinder does not suddenly drop, we are warned that the valve opens badly, that the muffler is closed, or that the piping is too small.

To obtain a knowledge of the pressure in the cylinder all that is necessary is to unite the interior of the cylinder to a small vertical piston, *D*, on the connecting rod of which has been fixed a pencil, *G* (Fig. 2). The greater the pressure in the cylinder the higher will the piston *D* mount. The spring *E* brings it down when the pressure is lowered. The pencil *G* is made to bear on a sheet of paper having a scale of pressures on the left-hand side,

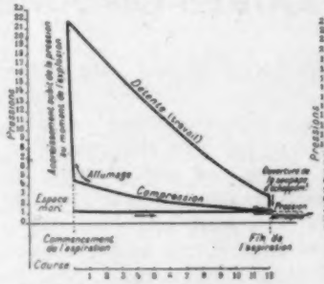


FIG. 6.—Approximate theoretic diagram. The maximum efficiency, impossible to obtain in practice, is indicated. Compare this with Fig. 7.

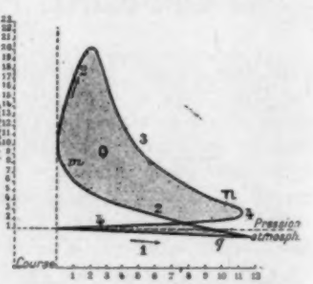


FIG. 7.—Actual diagram. I, intake with slight depression; compression and explosion, firing at point m, indicated by 2; there is sluggishness in firing charge; expansion (working stroke) is shown by curve 3, valve opening at n.

each division being equal to one atmosphere. The atmospheric pressure (that at which we live and at which our motors aspire) is at division *I*.

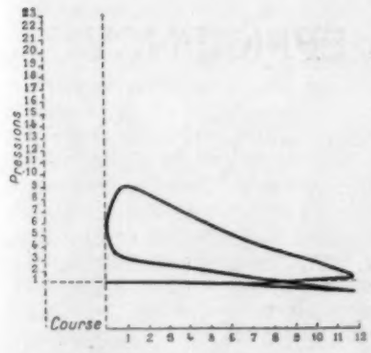


FIG. 8.—Diagram of a weak charge. Much resistance to admission; weak compression; feeble working stroke.

If the apparatus should describe the imaginary curve shown on Fig. 3, we should read that the pressure had at first been 2 kilograms; that it had reached 8½ atmospheres at point *P;* had mounted to 11½ at *Q;* that it had slightly exceeded 12 at the maximum; remained at this pressure for a very short time, and rapidly descended to 6 atmospheres at *R*, at which point we interrupted its working. The same for Fig. 4: The pressure mounted rapidly to 13 atmospheres; descended briskly to 9; remained stationary a little time, then fell rapidly to zero.

One element is missing in our observations. We know that the pressure increases and diminishes, but we do not know the positions of the piston corresponding to these variations. To complete our elements, therefore, we must obtain not only the pressure in the cylinder, but at the same time a registration of the position of the piston. Maintaining the vertical scale showing the atmospheric pressure, we establish a horizonal scale (Fig. 5) which will indicate in centimeters — the movement of the piston. Let us suppose that it is a piston with 120 m.m. stroke, or 12 centimeters.

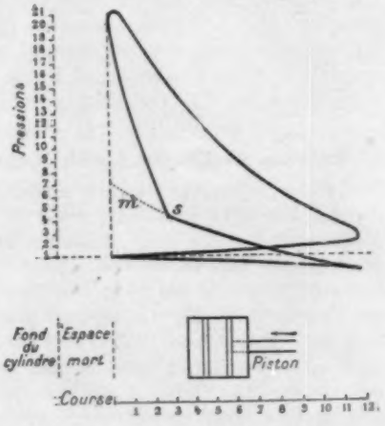


FIG. 9.—Diagram of charge with spark advanced too much. Firing should have been at m instead of at s

We had seen then by Fig. 5 that the pressure of 5½ atmospheres at point *S* was at the moment when the piston had travelled about 2 centimeters; that at *T* there was a sudden lowering of pressure between the tenth and eleventh centimeters, and that the pressure fell to zero at the end of the stroke.

With these indications it is easy to understand the working of the apparatus illustrated in Fig. 2. The piston *D*, in communication with the interior of the cylinder, moves the pencil in a vertical sense and enregisters pressure; but at the same time the displacement of the piston of the motor carries along this smaller piston and, in consequence, the pencil *G* in a movement from left to right and right to left. There are two pressures at work on the pencil, one moving it vertically and the other horizontally. Influenced by the two forces, curved lines are generally traced.

Supposing that in Fig. 2 the piston is compressing a mixture. We see that the pressure has gradually and normally increased from the point *M*, commencement of the compression, up to point *G*. The piston has still 1 centimeter to travel to reach the end of the stroke. The pencil would then be at *n* and the pressure would reach 4 atmospheres.

Let us now see what curve would be traced for a complete cycle of an internal-explosion motor. Theoretically the operation is as follows: The intake valve opens and aspiration commences (Fig. 6), the piston travelling to the end of its stroke and the cylinder filling. On this stroke the pressure is that of the atmosphere, and we obtain a distinct horizontal line. On the second stroke the piston returns, compresses the gas and increases the pressure, consequently the curve mounts more and more upon itself. Let us suppose a maximum pressure of 4½ atmospheres. The curve shows 4½ at the end of the stroke. At this instant—still considered theoretically—the spark is given and the pressure increases instantaneously to 21 or 22 atmospheres; the piston descends rapidly, the gases expand, and the pressure is lowered with rapidity. When the piston reaches the end of its stroke the exhaust valve opens and the spent gases quickly fall to atmospheric pressure. On the fourth stroke the piston ascends and drives out the gases. Supposing that the resistance of the piping and the air striking the gases is nul, the pressure in the cylinder during this stroke remains that of the atmosphere and the line of the fourth stroke is a horizontal one, covering exactly that of the first stroke. The surface outlined by the straight lines and curves represents the quantity of useful work effected by the charge.

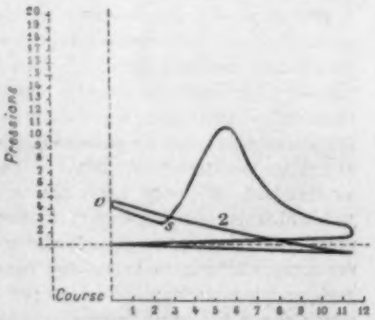


FIG. 10.—Diagram of charge with retarded ignition. Firing has not been done during compression stroke (curve 2); the gas, in expanding, has lost some of its heat, and pressure has fallen from v to s. Charge being fired at s, value of working stroke greatly diminished.

Fig. 7 is an actual diagram of a motor having certain defects, but still being very near the average. It will be seen that the surface circumscribed by the upper curve *Q* (from which must be deducted the surface of the small circle *q*, representing negative labor) is distinctly less than that of the theoretical diagram.

In reality the admission valve, the passage of air into the carbureter, etc., offer a certain resistance, producing a slight *depression* during the intake stroke and causing the line of the first stroke to descend below atmospheric pressure. The line for stroke 2 (compression) mounts progressively toward the maximum, the heat engendered by compression carrying it to 6 or 7 atmospheres. At this moment the gases are ignited.

It is interesting to note the messages that the motor gives us and to read its cry of suffering. Take Fig. 8 for instance. The motor is asking for more food. The admission line descends considerably below atmospheric pressure, a sign that gas is not arriving readily, compression is feeble, and the explosion weak.

Fig. 9 shows ignition too far advanced in a cycle of operations that commenced well. The charge was fired at *s*, when the piston had still 3 centimeters to cover; it ought to have taken place near the point *m*. In Fig. 10 ignition has been enormously retarded. Firing not taking place at the latest point, *v*, the point *s* passes below the compression line, for the non-firing gases at the point

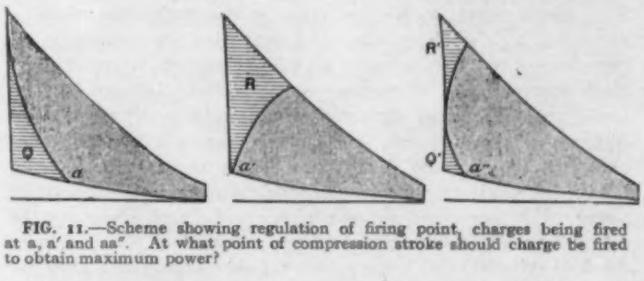


FIG. 11.—Scheme showing regulation of firing point, charges being fired at a, a′ and a″. At what point of compression stroke should charge be fired to obtain maximum power?

when the piston redescends do not benefit by the compression. To make further experiments, with a view to finding the best firing point he will see by Fig. 11 that if the charge is fired at *a* he departs from the theoretic diagram according to the value *Q*. He has fired too soon. If he fires at *a′* he has departed from the theoretical diagram by the value of the triangle *R*. He has fired too late. By firing at *a″* he will only be removed from the theoretical diagram by the value of the two small triangles *Q′* and *R′*, which together are less than the two preceding ones.

EFFECT OF SIZE ON THE THERMAL EFFICIENCY*

By H. L. CALLENDER, F.R.S.

IT is generally admitted, as already explained, that the thermal efficiency—and consequently the mean effective pressure for a given rate of fuel consumption—varies with compression-ratio very nearly in the proportion given by formula (2) for the air-standard. It would be easy to take account of this in the rating formula by substituting for the constant 0.40 in the A. C. formula the value E of the air-standard efficiency corresponding to the actual compression-ratio in the engine. The value 0.40 for the air-standard efficiency corresponds to a compression-ratio of 3.5, which is not uncommon in petrol motors, giving a compression-pressure of 70 pounds above atmospheric. By increasing the compression-ratio to 5.0, the factor E would be increased to 0.48, giving an advantage of 20 per cent. in point of power, of which the A.C. rating takes no account. But this advantage is obtained at the expense of increasing the compression-pressure to 118 pounds, which means that all parts of the engine ought to be made nearly twice as heavy to secure equal safety and smoothness of running, because the maximum pressure and the inequality of torque vary nearly in the same proportion as the compression-pressure.

The obvious objection to including the effect of compression-ratio in a rating formula, is that the volume of the compression-space is not easy to measure directly. It is, however, a comparatively simple matter to observe the effective compression-pressure by inserting a pressure-gauge with a check valve in place of the spark plug. This method has the advantage that the variation of the compression-pressure is much greater than that of the factor E, so that an error of one or two pounds is not a serious matter. The same method would also take account of any super-compression devices which might conceivably be employed to get more power out of a given size of engine. It is certainly most important that some account should be taken of compression ratio in fuel-consumption trials.

Effect of Size on the Mean Pressure.

As already explained, the variation of the thermal and mechanical efficiency with size, is such as to make the mean pressure equivalent to the B.H.P. vary approximately in the proportion given by the factor $(1 - 1/D)$, for similar engines. This factor may also readily be included in the formula, which then becomes,

$$\text{Efficiency Rating B.H.P.} = C\,D\,(D-1). \qquad \text{(P.C.)}$$

A formula of this kind, in which account is taken of the effect of size, is most useful in comparing the performances of small engines with large, or of multicylinder engines with single-cylinders of equal power. According to the A.C. formula, a four-cylinder engine with 2 inches bore and stroke (like the F.N. motor cycle engine), is rated at 6.4 horsepower, and is equivalent to a single-cylinder of 4-inch bore. According to my experiments the four-cylinder of 2-inch bore could not develop much more than 4 horsepower under ordinary conditions, and would stand no chance against the single-cylinder of 4-inch bore. A four-cylinder of 3-inch bore is equivalent to a single-cylinder of 6-inch bore by the A.C. rating, but according to the P.C. rating the single-cylinder would have an advantage in point of power of 25 per cent. A two-cylinder of equal power on the A.C. rating would have an advantage of about 12 per cent. over the four-cylinder, and a six-cylinder a disadvantage of about 10 per cent. These differences are far from negligible, though they diminish in importance as the size is increased. In practice, these disadvantages of the multicylinder type might no doubt fairly be set against the advantages of reduced weight and more uniform torque, but the necessity of applying some correction remains in comparing different sized engines of the same type.

An obvious objection to the P.C. type of formula is that the B.H.P. of an engine of 1-inch bore and stroke would be zero. According to the A.C. rating it should be 2-5ths of a horsepower. It would no doubt be possible to get such an engine to run if very delicately made, but the effect of ignition lag would be serious at the normal speed of 6,000 revolutions per minute, and I doubt whether it could be made to give as much as 1-10th horsepower on the brake. Another objection that has been urged against the formula is that the dimensions are not homogeneous. This is incorrect, because the figure 1 in the formula stands for 1 inch, and represents a length. If the bore is measured in millimeters the formula would read, $\text{B.H.P.} = D(D-25.4)/1290$.

The effect of size on the thermal efficiency of small engines, according to the P.C. rating, is nearly as great as that of compression-ratio. The effect of increase of bore from 2 to 4 inches is to increase the thermal efficiency 50 per cent. To produce a similar effect would require an increase of compression-ratio from 3 to 5, and of compression-pressure from 51 to 118 pounds. If it is thought desirable to take account of compression-ratio in consumption trials, the effect of size should also be allowed for. Both are included in a comparatively simple manner in the P.C. formula. For this reason it may be called the Petrol-Consumption (P.C.) Rating, because it gives the relative power for corresponding rates of consumption, *i.e.*, at equal piston-speeds. It takes no account of piston-speed, and corrected for compression the P.C. rating becomes—

$$\text{B.H.P.} = 2.5\,E\,D(D-1)/2.$$

Variation of Efficiency with Ratio of Stroke to Bore.

The chief advantage, in point of thermal efficiency, of increasing the length of stroke, especially in engines with high compression, is that the ratio of surface to volume in the combustion chamber may be thereby reduced. The surface of the combustion chamber is the most important in this respect, because the temperature, the temperature-gradient, the pressure, the time of exposure, and the velocity of turbulent motion, are all at a maximum during ignition, and because any loss incurred here affects the whole of the subsequent stroke and produces a maximum effect on the mean pressure. The remainder of the loss under consideration may without serious error be assumed proportional to that which occurs in the combustion chamber. Assuming the combustion chamber to be cylindrical, neglecting pockets, the ratio S/V of surface to volume will be $4/D + 2(r-1)/L$, where L is the stroke and r the compression-ratio. If the term A/D represents the variable losses proportional to S/V, and if the coefficient A has the value unity for engines for which SD/V is 9, the value of A for any other engine should be $(4 + 2(r-1)\,D/L)\,9$ under similar conditions. This reduces to unity in the case where $L = D$, and $r = 3.5$, which we have taken above as the standard case for petrol motors. The value of A will be the same for all engines for which $2(r-1)D/L = 3$. If we assume that the ratio of stroke to bore is related in this way to the compression-ratio, no alteration in the value of the constant A is required. Complete account of the variation of efficiency is taken by multiplying the formula $D(D-1)/2$ (which assumes the value 0.40 for the air-standard efficiency) by the factor 2.5 E, where E is the value of the air-standard efficiency corresponding to the actual compression-ratio of the engine. If the stroke and compression do not satisfy the relation assumed, it is easy to calculate the appropriate value of A, but no account should be taken of it in the rating formula, provided that the compression-ratio is allowed for by the factor E. Any advantage gained in efficiency by improved form of combustion chamber or ratio of stroke to bore, may be fairly credited to the engine, and, *per contra*, any loss due to excessive shortness of stroke, or bad arrangement of valves, is a fair penalty.

*Extract from paper read before The Institute of Automobile Engineers, London, continued from THE AUTOMOBILE, June 6, page 934.

If, on the other hand, the value of the compression-ratio is unknown, and it is desired to allow for the probable effect of the ratio of stroke to bore on the efficiency, assuming a standard value of the compression-ratio, the effect may easily be estimated by considering the variation of the coefficient A. If $A = 1$, when $E = 0.40$ and $L = D$, the variation may most conveniently be expressed, in the case of petrol motors, in terms of the excess $X = L - D$ of the stroke over the bore. We thus obtain $A = 1 - 0.5\,X/L$, approximately. If this is substituted in place of 1 in the formula $D(D-1)/2$, we obtain,

P.C. rating corrected for stroke, $D(D-1)/2 + XD/4L$.

In the case of petrol motors, X is very seldom so much as a quarter of L, and the added term XD/4L amounts to only 4%, in this extreme case, for a motor of 4 inches bore. Since the value of this correction is somewhat uncertain, if the compression-ratio is supposed unknown, it might fairly be neglected. But in preference to neglecting it entirely, I have generally taken it as X/6, being the average value of the correction between $L = D$ and $L = 2D$, and have included it in the correction given below for piston-speed. The probable error will not exceed 1%.

Variation of Piston Speed with Ratio of Bore to Stroke.

It is generally admitted that increase of stroke for a given bore means increase of available piston speed, and that this effect ought to be included in the rating formula. On simple theoretical grounds, I have independently arrived at a formula which appears to satisfy the necessary conditions. Assuming the mass of the piston and connecting rod for a given bore to vary as $(1 + L/nD)$, where n is a constant for a given design, representing roughly the ratio of the weight of the piston to that of the connecting rod when $L = D$, it follows immediately that, for a given maximum intensity of stress in the connecting rod due to the inertia of the reciprocating parts, the piston speed should vary as the square root of the ratio $(n+1)L/(nD+L)$. The possible variation of piston speed according to this formula is comparatively little affected by variations in design. The majority of designs appear to be included between the limits $n = 2$ and $n = 3$. Between the limits $n = 2$ and $n = 3$, the variation given by the theoretical formula follows remarkably nearly that given by the cube root of the ratio L/D. But since square roots and cube roots are troublesome to deal with, I have adopted a different type of formula, which is easier to apply, especially in the case of petrol motors where the bore is nearly equal to the stroke. If the excess of stroke over bore, namely $L - D$, be represented by X, being negative when the stroke is less than the bore, the variation of piston speed is approximately

Piston Speed $= 1{,}000\ (1 + X/(2D + L))$ feet per min.

Hill Climb or Speed Test Rating (Power Rating).

In order to correct the rating for the probable variation of piston speed with stroke ratio, it is only necessary to multiply the P.C. rating by the factor $1 + X/(2D + L)$. This correction should not be applied in fuel-consumption trials, because the consumption already takes account of piston speed. But it is required in hill-climbing competitions or speed tests, in comparing the performances of different engines. In the case of petrol motors, where the stroke is nearly equal to the bore, a further simplification may be effected. Since X is small, the factor for piston speed is nearly equal to $1 + X/3D$. Multiplying the P.C. rating $D(D-1)/2$ by this factor, and adding X/6 to allow for the effect of excess of stroke over bore on the efficiency, as explained in section 13, we thus obtain the simple formula,

Hill-Climbing Rating $= D(D-1)/2 + XD/6$. (H.C.)

The approximate formula H.C. is not intended to apply for large variations in the stroke ratio. It gives a rating 4.0 B.H.P. for an engine 3×5, where the complete expression, adding the term X/6 for improvement in economy, and allowing the fraction $X/(2D + L)$ for piston speed, would give 3.9 B.H.P. Within these limits the formula is close enough for practical purposes. But applied to an engine 3×9 it would give 6 B.H.P. where complete expression gives 4.9 B.H.P.

Relation of Power to Weight.

The formula here proposed to represent the effect of size has an important bearing on the question of minimum weight in relation to power. Assuming that power varies as the square of the linear dimensions, it would follow that the ratio of power to weight varies inversely as the linear dimensions, and would increase indefinitely as the size is reduced. If we assume instead that the power varies as $D(D-1)$ for similar engines, the ratio of weight to power reaches a minimum at two inches, and increases far more slowly with bore than in simple proportion to the linear dimensions.

Another important consideration affecting the weight ratio is the compression. If we assume that the maximum pressure is nearly proportional to the compression pressure, and that the strength and weight of the motor and its gear must be proportional to the maximum stress, we may take the compression pressure as a measure of the weight. Taking the air-standard efficiency E as a measure of the mean pressure and the power, we find that the weight/power-ratio is nearly twice as great for a compression-ratio 5 as for a compression-ratio 2, and diminishes with diminution of compression-ratio, reaching a minimum at $r = 1.9$ if $r = 1.40$. The best value of the compression ratio depends on various conditions, but chiefly on the ratio of the load carried to the weight of the motor and its accessory gear. If the load is equal to the weight of the motor, the compression-ratio should be rather less than 3. If the load is double the weight of the motor, the compression should be about 4.5. The above shows that in many cases where weight-saving is a primary consideration it may be desirable to reduce the compression considerably, and that even in automobiles there is no great advantage in increasing the compression-ratio beyond 4.0, provided that lightness and smoothness of running are considered.

Summary of Formulæ.

It will be evident from the previous discussion that no single rating formula can be applied universally. The factors of which account is to be taken, and the data available for comparison, will differ in different cases. Any proposed formula should be capable of modification to suit the requirements of the case to which it is to be applied. I have, therefore, endeavored to show how the formula should be modified to take account of different factors. Assuming that the primary object of a rating formula is to encourage efficiency irrespective of size, the necessary effect of size on the efficiency should always be allowed for in comparing similar engines of different sizes. This is represented by the factor $(1 - 1/D)$, but between the limits 3" and 6" bore the cube root of the diameter may be taken with an appropriate change in the constant. The piston speed may be taken to vary as the factor $1 + X/(2D + L)$, or as the cube root of the ratio L/D. This factor should be employed for power-rating in competitions, but not for estimating power in terms of consumption.

The formulæ are here summarized with reference to the factors of which account is taken in each.

D = bore, L = stroke, $X = L - D$, all measured in inches.

E = Air-standard efficiency $= 1 - (1/r)^{.4}$, where r = compression ratio.

Efficiency rating. (P.C.)

Bore only, $D(D-1)/2$, or $D^2\sqrt{D}/4.3$.

Bore and stroke, $D(D-1)/2 + X/6$.

Compression and bore, $2.5E\,D(D-1)/2$.

Piston speed.

Piston speed $= 1{,}000\,(1 + X/(2D + L))$, $= 1{,}000\sqrt{L}/D$.

Power rating, (H.C.)

Bore and piston speed, $(2D + L)\ (D-1)/6$, or $D^2\sqrt{L}/4.3$.

Bore, stroke, and speed, $D(L + 2D - 3)/6$,

or $D(D-1)/2 + XD/6$.

The formulæ may be multiplied by 2.5E to allow for compression, and by the number of cylinders in multicylinder engines.

LETTERS INTERESTING AND INSTRUCTIVE

How Can This Backfiring Be Cured?

Editor THE AUTOMOBILE:

[779.]—Here is a case of back firing into hte carbureter, for which, if you can give a reason and remedy, I would be much obliged. I have a Columbia light touring car, with double opposed motor, which gives very good satisfaction, except that at high speeds there is this constant popping and snapping from the carbureter explosions. The motor is very satisfactory except at high speeds.

I have lately had the valves all reground and properly timed. I am also sure that there are no short-circuits in the electrical system. The carbureter is fitted with a dash-pot, with a piston, which when raised by extra suction of fast running admits more air to the mixing chamber. This carbureter is about three inches nearer one cylinder than the other.

The only adjustment possible in this carbureter is that of the dash-pot valve, which can be arranged so that the piston uncovers the auxiliary air valves to a greater or less extent. This I have readjusted in various ways, but it does not correct the difficulty, and I have also seen that the carbureter is clean and all passages free. I would be very much obliged if you would answer this through the columns of "The Automobile." J. C. MOORE.

New York City.

From your statement in the case, we should judge the trouble you mention arose from some constitutional defect of the carbureter itself, as was the case with not a few of the old types of carbureters. However, that was before the day of the auxiliary air valve and the general adoption of the latter in one form or another seemed to have done away with this more or less common fault of earlier days, as it is rare to come across an instance of this kind now. We have seen numerous explanations of the trouble advanced but have never come across any that we thought satisfactory, apart from those involving exterior causes, such as leaking or improperly timed valves, which you mention do not exist in your case. Assuming that this has been done and that the motor is in good condition otherwise, also that no amount of carbureter adjustment has sufficed to remedy the trouble, we are at a loss to offer any suggestion of definite value, but there are doubtless a number of our readers who have gone through similar experiences in past times and they may be able to shed a little more light on the matter. We should think the makers would also be in a position to do this, as they were doubtless familiar with this difficulty in days gone by.

Neutralizing Exhaust Gases in a Closed Room.

Editor THE AUTOMOBILE:

[780.]—I wish to arrange some device which I can keep in my garage which will neutralize or absorb the burnt gas from the motor—so as not to poison the air. Conditions are such that I cannot run the gas out of doors. Can you give me any suggestions as to how to accomplish this? CHAS. A. SCOTT.

Denver, Col.

We do not know of any device that would accomplish the purpose you require. The process would naturally have to consist of the conversion of the carbonic acid and other gases contained in the exhaust of the motor into oxygen and hydrogen, and there is little doubt but that the cost of the apparatus necessary to do this would greatly exceed that of your entire garage. We should recommend not running the motor in the garage for any length of time. When necessary to run the motor to make adjustments take the car out in the street, if there is no other place available. The only other method would be ventilation, which you state is not possible under the circumstances, though we cannot conceive of a situation that makes clearing out of the noxious gases by natural means out of the question, particularly in a private garage. Not having the situation of your garage before us, it is impossible to make any suggestions of definite value concerning the remedy you are seeking, but regard the installation of any independent device impracticable and would not recommend it.

A Rather Bad Case of Overheating.

Editor THE AUTOMOBILE:

[781.]—I am quite a diligent reader of your correspondence columns on motor problems, but I do not remember seeing anything that would solve the litte problem which confronts me now. I have a four-cylinder, air-cooled motor, 4x4 bore and stroke, driving a light-weight touring car through planetary transmission. It is, in fact, a 1905 model of the Marion car, made in Indianapolis, and the whole car has stood up to its work and given excellent service. The problem is now one of proper cooling. No fan is used, the cooling being simply by means of flanges, which are shallow around the cylinder and quite deep about the valve cages. The first year and a half or more the motor did not overheat except under strenuous conditions, but now even a little work on low speed is apt to make it too hot to give maximum efficiency in power.

The exhaust valves were reground last fall, and the car has not been used much since. The commutator seems in good condition, and my storage battery gives ample current; in fact, the ignition part of the engine has been thoroughly gone over very recently. The carbureter, which is of the very simple old style Kingston type, is adjusted to give almost maximum air and minimum fuel without missing, which I have found gives me the greatest efficiency in the long run without overheating. I have tested the compression with a compressometer, which screws into the spark plug holes, and find a low compression with a maximum variation of only two pounds, i.e., the compression runs 25, 26, 27, 26. Doubtless the compression is higher when the engine is warmed up and a film of oil worked into the piston, since this compression was ascertained when the engine was comparatively cool and tested by jerking the starting-handle as rapidly as possible, in order to give as quick a stroke as possible, opening all the petcocks except the one in the cylinder on trial.

After experimenting with oils, I have found that the oil of heavy body and high test is the best for this engine, which uses the splash system. I am convinced that the oil is not at fault, and that the opening and timing of inlet exhaust valves are pretty nearly all right. At first I thought I was running with too rich a mixture, but having changed this, I find the engine still overheats, although not so much. There is a good deal of rust on the outside of the cylinders, but I do not see how this could affect the motor. Do you think that the needle in the spray nozzle of the carbureter has become worn, and would this have any effect with the proper adjustment? When last examined the carbureter seemed to be all right, and has given me less trouble than any other part of the engine.

Knowing what excellent work the engine is capable of, when I toured with it in Illinois and Indiana on hot summer days, and knowing that no part of it has given way or worn out, I am at a loss to account for this overheating. I shall be grateful for any suggestions you may see fit to offer.

Will say further that I frequently prime the cylinders with kerosene to keep them free from carbon, and there does not seem to be any preignition from this cause, although after stopping, if I remove the switch-plug without shutting the throttle, the mixture will explode in the cylinders with an evil odor at the exhaust. Tops of pistons were scraped clean last fall. The car has not been run all told more than 5,500 or 6,500 miles at the most.

St. Louis, Mo. JOHN GULLY COLE.

It would appear from your statement of the case that the trouble would probably be found to lie in both the carburetion and the ignition. Doubtless too rich a mixture is being used as this tends to overheat an air-cooled motor very badly, owing to the fact that it is very slow-burning and the spent charge issues through the exhaust in a practically incandescent state. Similar conditions in a water-cooled motor would require frequent refilling of the tank to replace the water boiled away. If the carbureter now fitted to the motor cannot be adjusted properly to overcome this objection, it would doubtless be found a good investment to replace it with one of more modern type. The ignition may be contributing to the overheating very materially by delaying the occurrence of the spark to such an extent that the result is the same as that caused by the overrich mixture. That is, the explosion does not take place until the piston has traveled a considerable portion of its downward stroke, thus causing the charge to do most of its burning on its way

out through the exhaust. This naturally causes a great loss of power and is a frequent and unsuspected cause of overheating. Efficient working of an air-cooled motor is dependent to an extent seldom realized by the average autoist, upon the explosion of the charge at exactly the proper moment and in the minimum time, so that the heat developed has as little opportunity as possible to be absorbed by the cylinder walls and valves. In other words, the greatest heat must be developed, its expansive power utilized and the great portion necessarily wasted gotten rid of, all in the shortest possible time. Examine the timer and coil adjustments very closely and see if they are not at fault; their condition may be such that while the position of the spark lever on the steering wheel would give the impression that the car is being run with the spark well advanced, the reverse is the case. An air-cooled motor should always be run with the spark advanced as much as possible, short of the point where knocking occurs. Rust is far from being a good conductor of heat and if the outside of the cylinders is badly rusted, we should certainly recommend that it be removed, although it may not contribute, except in slight measure, to the overheating complained of. The lubrication should be looked after carefully and kerosene injections resorted to more sparingly. Having given good service for such a period, it is certain that the overheating is not due to faulty design, as the trouble would then have appeared earlier. We think a thorough investigation along the lines indicated should provide a remedy and would be pleased to learn of the outcome.

No Benefit from Increasing Spark Beyond Certain Point.

Editor THE AUTOMOBILE:

[782.]—I have been much interested in the letters and inquiries which have appeared in your valuable journal from time to time, particularly with reference to matters of ignition. During the four years of my experience as an owner and driver of motor cars, I have been able to trace 75 per cent. of my troubles directly to faulty or defective ignition.

It always occurred to me that the spark usually employed to fire the charge was entirely too small in volume and force to give the engine its greatest efficiency; and recently I had the opportunity of testing the correctness of this theory. Driving with a friend in a car equipped with both storage battery and high tension magneto, the difference in power and speed was remarkable when running on the magneto, and it probably increased the efficiency of the motor no less than 20 per cent.

But many of us having good motors not thus equipped cannot afford to pay out $150 for a high tension magneto; and in seeking for a way to better my ignition system, I have thought of installing a single coil rated as giving a 2 to 3-inch spark, using a secondary distributor, and supplying the current with a storage battery of 8 volts and 120 ampere hours. In theory, such a coil and system should give eight to ten times the spark given by ordinary coils, and should very nearly approach the force and volume of spark given by the magneto; but whether it will do so in actual practice, I am unable to determine.

An answer to the question presented above will not only oblige the writer, but might prove interesting to the many thousands who, like myself, find their subscription of your journal a source of both pleasure and profit. GEO. G. CLOUGH.

Galveston, Tex.

We have always been of the opinion that the theory that you hold is erroneous and are borne out by extensive and numerous investigations, some of them made with painstaking care to ascertain exactly the effect of increasing the spark on the running and the amount of power developed. As both the laboratory and road experiments have led to the same conclusion we think that there can be little doubt but that beyond a certain point, no advantage whatever results from increasing the size or heat of the spark. However, there appears to be considerable misunderstanding on the point where the average autoist is concerned. It follows naturally that if the amount of current is so small that it does not produce sufficient spark to ignite the mixture, increasing it will do so, and if this increase be just enough to fire the charge under the most favorable circumstances, increasing it still further will certainly give it a greator factor of safety and consequently insure more certain firing under changing conditions.

But having increased it to a point where it is capable of firing the mixture under average running conditions, whether these be better or worse, the question becomes, Will it pay to increase it still further? We do not believe so and would not recommend your installing such a powerful coil as you mention. It would be a waste of money and would consume current much faster than you would care to supply it. Your idea that the magneto gives a spark of greater *volume* and that this accounts for the improved running is not correct. We have had the same experience as that mentioned by you, as far back as 1902, when we found it possible to easily get ten miles more an hour out of a car with magneto ignition than with a battery. We think the greater precision with which the timing is controlled and the fact that the magneto spark becomes stronger as the motor speeds up is accountable for the better service, for, as a matter of fact, it is possible to obtain a spark of much greater volume with a set of accumulators and a coil than with a magneto for obvious reasons. The letter of A. A. Kent, in this issue, is appropos. In it he says: "—nevertheless, after a certain spark heat has been obtained, an increase in the heat will fire the engine no better." For the most exhaustive and complete investigation of the subject that appears to have been made we would refer you to the issue of THE AUTOMOBILE of March 21, 1907, containing an article by W. Watson, D.Sc., F.R.S. We think that probably an overhauling of the ignition syystem of your car, paying particular attention to the timer as well as the current consumption at the coils would result in improvement, though you naturally cannot expect to equal the results obtainable with a modern magneto.

SUBSTANTIATING MR. JACKSON ON DRY CELLS.

Editor THE AUTOMOBILE:

[783.]—Let me first quote from the article of Arthur F. Jackson, in your issue of May 23, as follows:

First—"Dry cells, when properly used, furnish the best ignition. The cheapest, cleanest and safest."

Second—"Many are under the impression that excess of voltage is injurious to coils, but that any ampere rate of current may be used without harm."

The first statement is a very broad one, and while my knowledge of magnetos, etc., is very limited, I want to heartily indorse the statement so far as it refers to wet or storage batteries, and in hope it will help some brother who is searching for good ignition and debating whether or not to spend good money for a storage battery, I want to distinctly state that I gave away my last storage battery, and it was in good condition and of a very well-known make, and I am now relying with perfect comfort and satisfaction on small dry batteries.

These are my reasons: About a year and a half ago I bought a small four-cylinder car of a good make, second-hand. It had in it two storage batteries of four volt 60-ampere hour capacity each. I was given to understand that these cells should be recharged every month or six weeks, whether used or not, so about every three weeks I would take first one and then the other to be charged, and must honestly say I never had any ignition trouble that I could lay to these cells other than the trouble of taking them to be charged, going after them, and paying each time the price of three dry cells, viz., 75 cents.

Being told that I would get more power if I had six volt cells instead of four volt, I decided to find out for myself, arranging my wiring so that with my switch one side I got four volts and on the other side took both batteries in series, getting eight volts. I took a day's run in the country. Using first four then eight volts failed to show any appreciable difference, so I decided not to waste any money changing my batteries for those of six volts.

Last July I sold that car, and when selling it took out one of the wet batteries and replaced it with dry, feeling that it was fair to the purchaser and keeping the one to put in a new car. I purchased a new car of the same make. It had in it 16 small dry cells in series of fours, wired up in two sets of eight, each connected in series-multiple, each set of eight constituting a complete battery connected to one side of the switch. This, as I understood it, would give about six volts from fresh batteries of four volts after some service. I decided at once to give these batteries a fair trial and see what they would do in the way of service, and being told that the double fours to a very great extent avoided the necessity of shifting from one set to the other, I simply ran on the right-hand set until they gave out, and the result was that I ran from about

July 25 until the middle of October, covering over 2,300 miles before the first eight cells gave out. A pretty good record.

Then, wasting no time with ampere meters, I simply threw out these eight cells and put in eight new ones and began to run steadily on the original left-hand set of eight. These carried me until February, when they gave out, partly, I believe, from age, as I did not double my first mileage.

However, I then commenced on my third set, and to-day, with 4,400 miles up, they are still running strong.

I feel very positive of getting from 1,500 to 2,000 miles on every set of eight cells, and in ten months have used up $4 worth of dry cells, with $2 worth now in service and partly used up. I have had no battery troubles whatever, and, personally, do not want any storage batteries which would have cost considerably more for recharging, to say nothing of original cost, depreciation, and the trouble of having recharged frequently. Buy fresh cells, be sure your wiring is good in every way, and do not waste time with ampere meters which damage dry cells, hook your cells up in double sets, and you won't have any trouble with the much-abused but very good dry cells.

As I said above, I gave away the storage battery which had been saved from my first car.

Mr. Jackson's second statement hits me very hard, for I certainly was one of the "many." I firmly believed that with low voltage, say not to exceed six, no matter what the amperage, there was no chance for damage to a coil, and I would like very much to read in your valuable paper some further articles on this subject.

New York City. GASOLINE SAL.

RESULTS OF EXTENSIVE IGNITION EXPERIMENTS.

Editor THE AUTOMOBILE:

[784.]—I have read with a great deal of interest the articles published regarding the necessity pro and con of a hot spark against a weak spark for igniting gas, and notice in your answer to letter No. 766, from Charles E. Duryea, that you would like to hear other opinions regarding this question. I have a long time refrained from entering my opinion in regard to this, as I did not wish it misconstrued as advertising the ignition system which I have had on the market for the past two years.

However, as this system has so many differences from other systems with which trials have been made and eliminates several points which have made experiments with others somewhat questionable, my experiments may throw some light on the subject.

I use entirely jump-spark produced from non-vibrating coil. The primary circuit made and broken by mechanism driven synchronously with the engine and the secondary current is distributed to the cylinders of the engine. The mechanism by which I made the primary contact will not vary the time of the spark by variation of the contact adjustment. Neither will the strength of the battery have any effect upon the timing of the spark, as is the case with the magnetic vibrator coil where a weak battery is liable to retard the spark or a light adjustment of the vibrator advance the spark, therefore as I am practically positive regarding the timing, I am able to deduct results on the size of the spark.

By thermometer experiments in my laboratory I have shown that a spark at low temperature can be produced by low primary battery voltage of four and a half volts and a spark of many times that temperature can be produced by high battery voltage of fifteen or sixteen and a half volts. I am also able to vary the size of the spark without varying the timing of the motor by an adjustment in the contact maker.

Although my experiments have never been performed with an engine on a test block, tests have been made with a large number of makes of cars on the road. I have invariably found that a low voltage and a light adjustment which produces a weak spark will not fire an engine as powerfully as will a stronger spark; nevertheless, after a certain spark heat has been obtained an increase in the heat will fire the engine no better. This limit varies greatly with different engines and carbureter adjustments.

I draw my conclusions from my own personal experience on over 150 cars of between 30 and 35 different makes, so possibly these results may assist others in their deductions. A. A. KENT.

Philadelphia, Pa.

AN OPINION ON SOLID TIRES FOR SMALL CARS.

Editor THE AUTOMOBILE:

[785.]—I have read considerable discussion in your paper on the question of solid tires for automobiles, and they all appear to come either from some doctor, or else from a solid tire maker. I believe that all the doctors almost in their practice use small runabouts of light weight and run on city streets that are paved, where the surface is smooth, and I believe that under such conditions solid tires might give fair service.

As one who can speak from having (country) experience, however, I must say there is another side to it. Two years ago, knowing the faults of the pneumatic tire, and attracted by the literature of a solid tire manufacturer, I was induced to invest in a set of them and have them applied to my wheels. Now as to the locality where they have been used, I will say that I live where there are quite a number of hills, and some rock on those points; we have no macadam roads and the land is a heavy black soil with very little sand, and, in consequence, our roads are very hard when dry, and have many little bumps or raises even when the ground is worn smooth on the surface.

This makes a road that creates considerable vibration on the springs, even when running at a low speed, say, of 12 miles per hour, and, while the cars that have been using pneumatic tires here have no trouble in making 20 miles per hour, a solid tire will rack a car to pieces at that speed, as it finds and transmits to the springs every little inequality of the road's surface, and while a pneumatic tire will give and roll over a little bump with but slight raise to the axle, a solid tire does not, every claim of the manufacturer to the contrary. Further, solid tires have a side-swaying tendency that gives them the most of the resiliency they possess, and this very side motion makes them very hard to guide and have a tendency to skid off to the side into the ditch whenever you get on a place like the side of a grade.

Now as to my own experience, I have a two-seated touring car with 10-horsepower engine and which weighs, complete, with gasoline, water, and full equipment of tools, exactly 1,800 pounds and which is geared to make only 24 miles per hour at highest speed. Further, I had it fitted with very resilent full elliptical springs when I had the solid tires applied, and yet in the two years that we have used them I have broken two rear axles and three front steering knuckles. After the first one broke, at no time has the car been run at over 15 miles per hour. I don't dare to. In the two years I have not run it over 1,500 miles, and yet the tires have cut worse than pneumatics doing more work than I do, and I find that whenever a piece gets started to cut out, it either cuts out there very fast, or else the tire breaks square across clear to the bottom. I feel that I have given them a good trial, and I am done with them, and would be glad to sell them for half price.

Cedar Point, Kan. SOL WILLIAMS.

A SUGGESTION THAT MAY AID No. 767.

Editor THE AUTOMOBILE:

[786.]—In regard to the complaint of No. 767 and your suggestions to same, would say that I am having the same trouble with a four-cylinder car. In my case the trouble is exactly the reverse of your explanation and is due to practically a flooding of the carbureter producing a mixture too rich for explosion. When I succeed in lowering the level of the gasoline in the float chamber so that it is where it should be, just at or a trifle above the opening controlled by the needle valve, the engine starts with a quarter turn. If car is left standing with gasoline turned on, the float chamber gradually fills until the gasoline is almost level with top of float. When this happens, it is impossible to start the engine, hot or cold, until the level of gasoline is reduced to where it should be, when priming and allowing the gasoline to evaporize by waiting a few seconds, before cranking, will start the engine. After it is once started, it runs all right because it uses the gasoline as fast as it comes. Further, if this is the cause of No. 767's trouble, he will find the plugs apt to be sooty and that opening the throttle wide will stop the engine instead of increasing speed. I corrected my trouble of this kind temporarily by putting two or three small corks under the float (loose) the added lifting power of which was sufficient to cause the float to cut off the gasoline flow at the proper level. Then, an added precaution until I get a float which will do its work properly without assistance from foreign bodies in the carbureter, is to cut off the gasoline flow at the petcock before stopping the engine. By so doing, the float chamber does not have the opportunity to fill up slowly when car is standing with engine stopped and I am able to start always by opening petcock and cranking immediately. I shall be glad if this chances to be of any service to you or Mr. 767.

Summit, N. J. ELIOT GORTON.

BUICK GETS SECOND INSTEAD OF THIRD.

Editor THE AUTOMOBILE:

[787.]—With fairness due to the Buick, I think you should be advised that a protest which I lodged at Wilkes-Barre, Pa., against a special Maxwell racer, on the grounds that it was not a stock car, has been allowed by Referee C. B. Roberts, this giving the Buick second place instead of third, the winning Maxwell making the hill in 3:07, and the special Maxwell racer making the hill in 2:47 having been thrown out.

It is quite possible that you did not get this information, but the facts above are true, the referee having awarded us second prize, which we now have in our possession. We will therefore ask you to place the Buick as second in the $1,000 event to the winning Maxwell. H. J. KOEHLER.

Newark, N. J.

MODEL C, THE SIX-PASSENGER, 40-HORSEPOWER TOURING CAR.

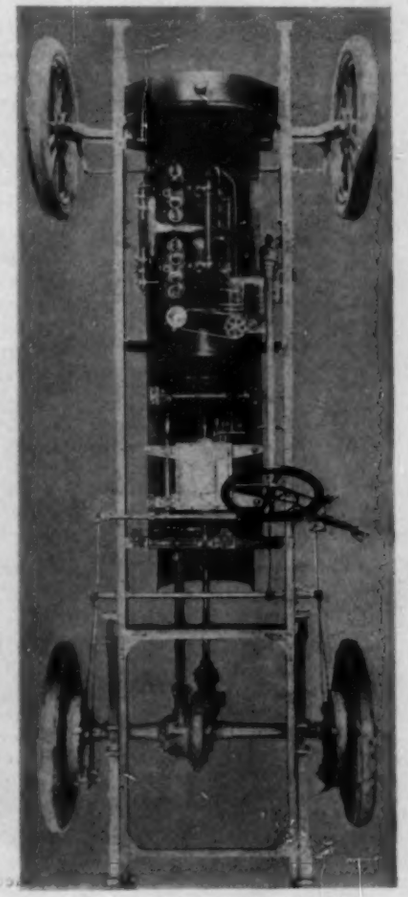
CONNECTICUT is coming along as an automobile-building State, having recently received another addition in the shape of the Continental Manufacturing Company, located in New Haven, which is an outgrowth of the University Garage Company, long well-known in the college town. The company was formally incorporated on March 1 of the present year with a capital of $100,000, and will devote its energies to the construction of the Continental car of foreign design, three models of which are now being placed on the market.

Model C will doubtless be the mainstay of the line, as it is a standard 40-horsepower six-passenger touring car of the generally accepted type. The remaining members of the trio are Model A, a physician's three-seated runabout, equipped with a four-cylinder 35-horsepower motor, and Model B, a semi-racing touring runabout on the same chassis.

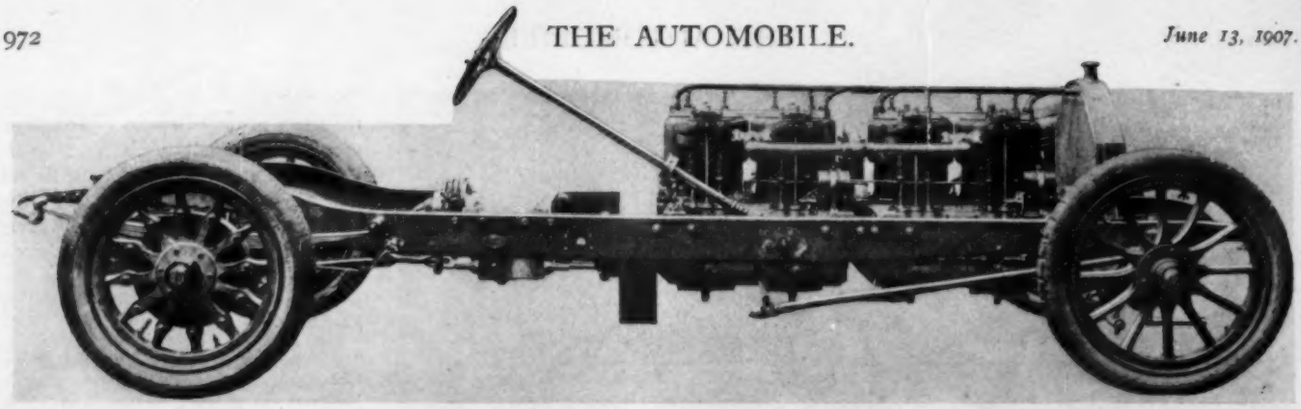
The motor design of the touring car is characterized by the use of independent cylinder castings, the dimensions being 4½-inch bore by 5-inch stroke, the valves all being placed on one side and operated from a single camshaft. The latter is also true of the runabout model except that the cylinders are cast in pairs, in other respects the designer having paid particular attention to the simplification of the power plant and chassis in order to facilitate manufacturing, so that on the whole the three models are built along the same general lines, which have been taken from those found so successful in foreign practice. Special gray iron is used in the cylinders and the latter are ground and polished, the connecting rods, valves and gears being made of nickel steel, oil-hardened and ground to finish. Throughout, the details of the design of the motor, as well as that of its essentials of carburetion and ignition, standard and well-settled practice has been adhered to, the makers not attempting to introduce any revolutionary ideas or innovations.

The clutch is of the multiple ring type, consisting of five members, two of which are fitted with cork inserts, while the next step in the transmission of the power consists of a sliding type of gear-set with selective operation, all the pinions being oil-hardened and having their teeth cut with special beveled faces to facilitate the ready engagement of the pinions as well as to make them silent-running. Final drive is by propeller shaft, particularly designed to run in practically a horizontal plane with the car carrying a normal load, attention also having been paid to the matter of ample clearance, 10 inches in the clear being allowed, in which respect foreign standards have been radically departed from in order to adapt the car to American roads. In each model the weight has been centered well between the axles, the motor being placed to the rear of the front axle and the back seats of the tonneau not being extended beyond the rear axle, the latter being an objectionable feature of some American cars that can only be appreciated on trial over a rough road.

While all three models are along the same general lines, each has been specially designed for the purpose in view, the Model A, physician's three-seated roadster, having a 25-horsepower motor and a 100-inch wheelbase. It is shod with 34 by 4 inch tires on all four wheels, and tips the scales at 1,900 pounds. The Model B carries a 35-horsepower motor, has a 112-inch wheelbase and the same tire equipment, but its total weight is only 200 pounds greater, or 2,100 all on. The Model C, which is the standard touring car of the trio, has a 40-horsepower motor and a wheelbase of 120 inches. Its total weight is but 2,500 pounds, and it is also equipped with 34 by 4 inch tires. Particular attention has been paid to the matter of body design in every one of the models, the touring car being equipped with a straight line body of the accepted foreign type; it has ample seating capacity for six passengers with plenty of storage room for baggage under both the front and rear seats. The runabout body is of special design, the body being placed much further back with a recessed type of dash, considerably lower than is the case on the touring car, in order to blend with the lines of the remainder of the car. The seats are also somewhat lower and side doors are provided at the dash on both the runabout types, the physician's car complete, with top, making a most attractive and business-like appearance. A rumble seat is provided, giving a seating capacity of three people, and provision is made for the stowing of a trunk under the chauffeur's seat. Control is by means of the usual small spark and throttle levers mounted on top of the steering column on a stationary sector, while for city driving an accelerator pedal is provided, in addition to a handy muffler cut-out. A somewhat novel innovation in the way of driving control is found in the single pedal acting on both the clutch and the running brake, while a second pedal controls a powerful double brake, in addition to the unsual emergency brake operated by means of a side lever. The factory in which these cars are being turned out has recently been completed, and comprises an L-shaped building running 200 feet east on Olive street and 200 feet south on St. John street, New Haven, each wing being 65 feet wide. It is three stories high and is equipped with modern facilities.



CHASSIS OF THE CONTINENTAL.



ONE OF WEIGEL'S EIGHT-CYLINDER, 80-HORSEPOWER BRITISH FLYERS BUILT FOR GRAND PRIX RACE.

WEIGEL'S BRITISHERS FOR FRENCH AUTO RACE

LIKE the American champion in the Grand Prix of the Automobile Club of France, the two British candidates for victory have a distinct individuality. Partly owing to the late appearance of the regulations and the still later announcement of the date of the race, and partly because of a desire to show the value of their standard construction, the Weigel Company decided to employ two standard four-cylinder engines on a racing chassis. As will be seen from the illustration of the chassis, the two forty-horsepower motors are placed tandem fashion, with special crankshaft and camshaft, the former being over six feet in length. There are only four throws and five bearings to this unique crankshaft, two pistons being connected to each crank-pin, and two cylinders firing together in the order 1-8, 4-5, 2-7, 3-6. Cylinders, which are cast in pairs, are 130 by 140 bore and stroke. Valves are on opposite sides, operated by cams formed solid with the shaft. Standard forty-horsepower crank-chambers are employed, bolted rigidly to two stiff steel strips forming a foundation for the engine, and preventing strain upon the crankshaft through springing of the frame. Both engine and gear-box are mounted direct to the side frame.

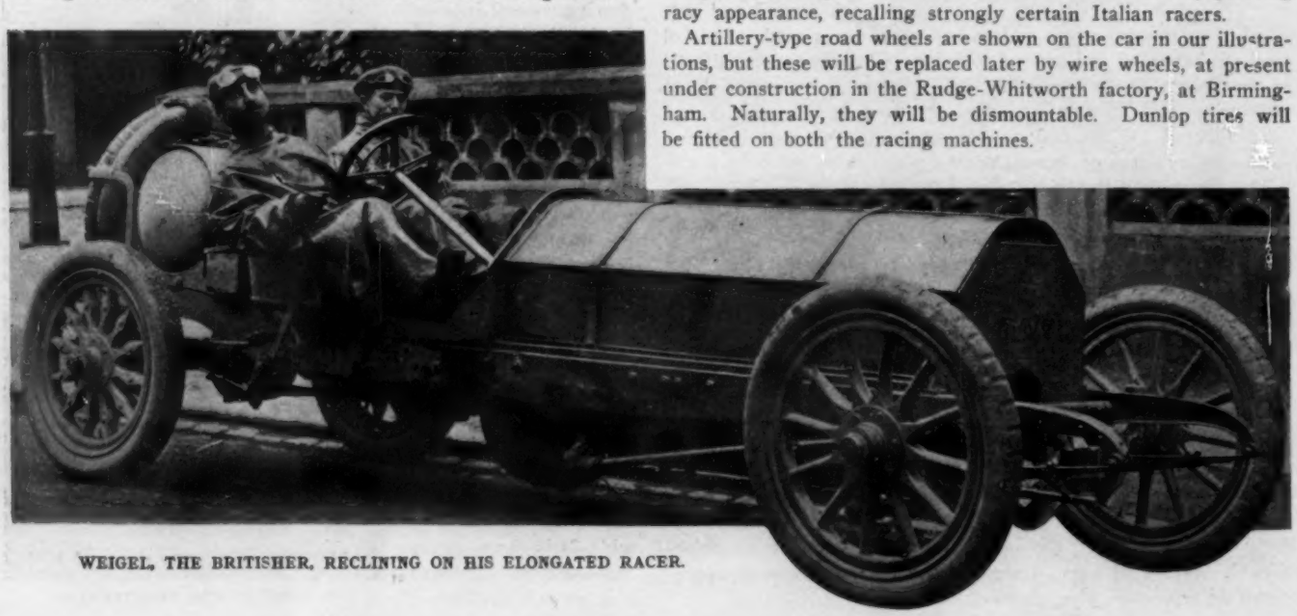
Ignition presents some new features as the result of the grouping of the two engines. It had been intended to construct a special low-tension magneto, with two separate armature windings and two collector brushes. Owing to shortness of the time, however, this had to be abandoned, and two low-tension magnetos of French construction were adopted, driven from spur wheels situated in the center and at the forward end of the inlet valve camshaft. A spur wheel on exhaust camshaft drives the high-tension distributor for the accumulator-fed ignition.

At the present time a single float-feed perpendicular currents carbureter is being employed, placed between the two groups, with induction pipe on the right-hand side passing left and right and entering each pair of cylinders. Experimental work is being carried out, and it is quite possible that in the race the machine will have two distinct carbureters. Tests on fuel consumption have not yet been completed, though the makers declare that it is well within the neighborhood of one gallon per ten miles. It should be noted that the multiplicity of cylinders does not tend toward economical fuel consumption. Even six-cylinder engines are considered to be at a slight disadvantage under the Grand Prix rules, and it is to be feared that the Weigels will be more heavily handicapped than their competitors.

In the transmission there are modifications on the standard type of Weigel machine. A very large fly wheel—unnecessarily large it might be objected—is carried at the rear of the engine. It is somewhat surprising that advantage has not been taken of this special form of construction to place the fly wheel between the two motor groups. The standard multiple disc clutch is fitted, transmitting the power to a special gear-box, giving two-speeds forward and reverse, neither forward speed providing direct drive. Final drive is by cardan shaft and rear live axle of standard touring machine construction.

Naturally, for such a long engine, a special frame has had to be employed. It is of deeply cambered channel section steel, parallel throughout, lined with wood and raised at the rear to clear the back axle. Tubular cross stays are used. The dip of the front axle has been considerably accentuated to get a low-hung body. In general outline the machine has a very pleasing racy appearance, recalling strongly certain Italian racers.

Artillery-type road wheels are shown on the car in our illustrations, but these will be replaced later by wire wheels, at present under construction in the Rudge-Whitworth factory, at Birmingham. Naturally, they will be dismountable. Dunlop tires will be fitted on both the racing machines.



WEIGEL, THE BRITISHER, RECLINING ON HIS ELONGATED RACER.

Smart Effects in Automobile Fashions

BY LAURA B. LEIPLE

INCENTIVE towards smart dress for automobiling was never so pronounced; while makers of fashionable toggery were never more encouraged. Society is not content with plain attire as was the case a year ago. Materials employed in many of the handsomest garments are finest imported worsteds, pongees and silk mixtures. Models are as carefully designed as elaborate tailor-mades and headgear is being improved every day. The day of severe motor clothes is past and before many moons we shall hear as much discussion over apparel for the pleasure as the average woman deems necessary for her choicest evening clothes. There was a time not very long ago that little or no interest was given to the fit of the automobile coat; it might be as loose as a cape or as plain as the strictly tailored garment could be made. But now there is a universal cry for fancy effects and the fashionables will not recognize anything short of extravagant materials wrought into the most intricate models, many of which are elaborately trimmed.

Among the novel coats imported for early summer wear is a preponderance of pongee, not the thin, glazy sort, but a heavy, firm texture that insures endurance and is proof against dust. Recently the craze for fitted coats has overtaken society and the woman with a fit figure is sure to include in her automobile outfit one or two of these trig garments. A very charming model is fashioned after the style of a Russian blouse with snug belt and full circular skirt. The collar is rather high and closes with a tab. A panel effect in the front is finished with two rows of fancy buttons set on to give a broad effect, and the full sleeves are finished at the wrist with buttoned-over cuffs to protect the arms. Touches of tobacco brown are introduced in the trimmings appearing on the collar, cuffs and in pipings on the double-breasted front and narrow belt. Such a garment is not only adaptable for automobiling but for driving and traveling.

A rain and dust coat is a valuable possession in summer, whether one owns an automobile or rides in train, carriage or trolley car. One of the fascinating models recently unboxed, is of heavy pongee in its natural color trimmed with brown and tan checked silk, further embellished with pipings of plain brown. This model is loose fitting and differs from other garments cut on similar lines, inasmuch as its elaborate tailoring makes it available for almost any use. The unusual feature about this coat is the novel way in which the panels running from the shoulders to the line below the waist are fashioned. Beginning in the shape of a Gibson shoulder cape they extend down the fronts and curve under the arms, ending in rather good-sized pockets finished with buttons. The high turnover collar closed with the same fancy bone buttons and the lower parts of the long sleeves echo the treatment both in trimmings and buttons.

Pongee is used in many stylish and inexpensive coats and dresses, but it is sure to look mussy unless in the heavier qualities that are not made in America. If one does not feel disposed to invest in a fine pongee coat, mohair is next in choice. For actual service there is nothing better, provided the color be excellent in the beginning; if it is not, the result after the first long run in the sun is discouraging; blues and browns suffer most when exposed to strong light, but tans, grays and cream color will give fairly good service if a good quality mohair is used. Some of the most effective garments of this material are in rich plaids. Green and blue combinations are liked by many, while maroons, browns, greens and blues are found in the more elaborate combinations. To return to pongee, it tailors beautifully, keeps its shape well, sheds the dust as no other fabric does and is found in almost any color desired. As a rule, a good wetting will render it unsightly at the seams, which is of course a disadvantage, but if perfectly tailored this disastrous feature can be eliminated by proper staying, sponging and pressing in the beginning.

A good mohair has much to its credit. Some extremely good-looking automobile coats in mohair of excellent quality in soft grays and champagne colors shot with black or white or even green, give splendid service. The majority of these coats are plainly but smartly tailored and without trimming save for stitching and metal or pearl buttons. Now and again one will see the collar and cuffs of plain color corresponding in tone with the accessory color; this is of leather as often as it is of mohair or ribbed silk. There is a strong vogue for checked effects in black and white, brown and white, or with an indistinct thread of bright red or green appearing at distances of several inches apart. A stunning French coat of pongee in that lovely shade of blue known as Copenhagen, is piped with white leather and further embellished with the same material in the form of cut-out figures through which the soft blue appears. Some striking effects are obtained in decided stripes and others less pronounced, but extremely smart in modes having darker stripes and varying widths. The latter combination is, perhaps, the most recent adoption among the new fabrics.

FITTED COAT OF PONGEE.

In anticipation of mid-summer motoring, when woolen coats are discarded on short runs, coarse linen of the homespun variety promises to be much to the fore. In appearance and durability the soft, hand-woven linen coat has much to recommend it. Besides being extremely comfortable it is smart when well cut and tailored, and, above all, is washable. Sometimes variation is given to such garments by additional collars and cuffs of velvet, which are detachable. This decoration is seldom if ever found in the ready-made garment, but it is not a difficult matter to have a separate set made to meet the requirement. A practical feature about linen is the dampening and pressing after it has become sadly wrinkled, which treatment renders it like new. If possible, it is always best to have a homespun linen washed and

COMBINED HOOD, SHIELD, VEIL.

put through a shrinking process before being made up; this being properly done, there will be no trouble arising from shrinkage after the garment is completed.

One essential point about the motor coat for comfort rather than ostentation is to have collar and cuffs capable of closing snugly. This season designers have introduced a number of picturesque styles devoid of this practical feature, with collarless necks and Japanese sleeves that offer no protection whatever. These do nicely to slip on over the dainty summer frock with billowy sleeves that would hardly withstand the dragging on and off of a close-fitting wrap, and for short jaunts to a neighbor's lawn party or evening entertainment the kimono coat is ample protection for the occasion. Of these charming little garments there are some stunning effects in tussores, with artistically draped shoulders and loose sleeves ending in points finished with tassels. For this particular use broadcloth in delicate shades is paramount. A charming wrap of this character is in scarlet broadcloth trimmed with gold braid and tassels.

The handsome coats and dresses in supple leather must not be overlooked. Many of these are wonderfully tailored and in lovely colorings, but are practicable only for extended motor runs and for cool weather. A fascinating suit in Russia colored leather is made with gored skirt trimmed with manipulations of leather pipings above the hem which, by the way, is fully five inches from the ground. The trig little coat is semi-fitting with belt to close it as snugly about the waist as one desires. Turned-back cuffs, high collar and flap pockets that button down complete one of the smartest leather costumes brought out this season. A golden-brown crin (horsehair) hat with extra drop at the back to protect the hair, is cunningly trimmed with rosettes and wings in corresponding color, tipped with green. High boots with Russia leather vamps and suéde tops carry out the *tout ensemble*.

DUST AND RAIN PROOF COAT.

As to hats, almost any small shape that will resist the wind and may be comfortable and fetchingly secured to the hair is considered correct. But after all is said and done, there is nothing quite so satisfactory as a big veil arranged over the hat and tied in a coquettish bow at one side, allowing the ends to float in the air. One of the recent arrivals from Paris is an odd little Panama hat, with straight brim and dented crown. The simple trimming consists of a polka dot scarf twisted around the crown and falling over the left side. These ends are so arranged that they may be turned over the top of the hat and tied under the chin when an extra veil is not desired.

Novel effects are always met with enthusiasm, but scarcely has there been such a mad craze for the unusual as the flowered chiffon or crêpe scarfs are creating. Dealers are already beginning to complain of the shortage in the market of these gay head coverings. Some of the handsomest ones are of crinkled crêpe spattered with great bouquets of vivid roses; others are ornate in Persian colorings, while huge polka dots play a leading part among the fancied patterns. Bright red poppies cast among wheat heads and green leaves decorate one of the most daring effects seen in practical use. There are some lovely ones in soft crêpe embroidered with silk in cherry blossoms; others have shattered roses decorating their full length; some in natural colorings, others in self tones.

When it comes to the automobile veil, that answers best all requirements, there is nothing more practical than heavy chiffon shirred on a ring and divided at the back, with long ends crossing and brought forward, where any desired means of securing them may be employed. Of goggles there is little to mention that is new, save for the steel lenses with tiny slits running crosswise. These were first intended for racing purposes, but recently femininity has adopted the unique invention with marked enthusiasm. A photograph of these lenses is shown in the title of this article on the preceding page. At first glance it would seem as though it would be impossible to see through such a small opening as the slits in these steel lenses present, but their close proximity to the eyes makes the radius of vision ample for all necessary purposes.

To briefly summarize, the trend of fashion in automobile apparel, as far as women's garments are concerned, will tax the artistic resources of the art of smart tailoring. So popular has automobiling become that its many devotees demand variety in fashion, and this demand can only be satisfied by designs that are special in character, and which will lend individuality to the wearer.

MOTORCYCLES FOR WOMEN

Some of the foreign papers devoted to outdoor sports sometimes depict women riders of the motorcycle, but on this side of the water the sport has made rather slow progress. A western maker of motorcycles has, however, completed one of these machines for his 15-year-old daughter, and, as she promptly made 65 miles with it over country roads on her first trip, she may be regarded as being to the manner born. The dropping of the frame has naturally brought about some construction problems, which seem to have been well solved. The machine is belt-driven, and in order to avoid the risk of catching the rider's skirts, both wheels have casings.

The maker has also been confronted with a number of other problems in the adaptation of the motorcycle to a woman's use which are more difficult to overcome, at least for the maker himself, for they lie somewhat outside of his province. They are, in fact, more closely connected with the marketing of the machine, and thus form part of the dealer's duty, and they consist mainly in overcoming the prejudice of the eternal feminine to anything that savors of the mechanical or that requires systematic supervision. It is notorious that a woman never oils a sewing machine nor winds up a watch regularly, so that how to make her realize the pressing necessity of these little attentions in the case of the motorcycle forms a very considerable part of the problem.

LATEST WHIM, FLORAL SCARF.

MEMORIAL DAY AUTOMOBILE PARADE AT SEATTLE, WASH.

SEATTLE'S AUTO CARNIVAL.

SEATTLE, WASH., June 8.—More than 200 cars participated in the Decoration Day parade, which proved the greatest turn-out of the kind ever held in the Pacific Northwest. The weather conditions were ideal, and as Summer weather has been here for some time there was an abundance of flowers with which to decorate the cars.

One of the large Seattle sight-seeing cars headed the parade with a band. The prizes were awarded as follows:

For the best decorated car, Mrs. Josephine North, Oldsmobile; second prize, G. W. Miller, Winton; third prize, Jonathan Gifford, White.

Mrs. M. Baker and Mrs. J. Froom carried off the honors for electrics driven by women. The car was a Babcock.

Mrs. Garrett Fisher took the prize for gasoline cars driven by women, her machine being a two-cylinder Rambler.

H. Grimshaw took the prize for the most novel decoration effect, his scheme being simply a sedate brown dog wearing a pair of goggles.

Society was well represented at the afternoon race meeting, and there were hundreds of cars on the track.

The interesting event of the day was the five-mile, in which the contestants were Capt. Caine's Thomas, with "Chicken" driving; Pacific Coast Auto Company's Pope-Toledo, with Tommy Pillow at the wheel, and W. O. Williams, of Tacoma, Pope-Toledo, with "Slats" Blanchard driving. The Tacoma car fell out after the second mile, owing to something going wrong with the steering gear. Pillow won the race in 6:05 2-5, with a lead of 300 yards. The winning car later made a mile in 1:12 2-5.

The feature of the program on the second day was the ten-mile race for the *Times* cup. F. G. Plummer, driving a Cadillac, won in 12:11 2-5.

Another thriller was a fifty-mile race for touring cars fully equipped. Plummer also won this, driving a Cadillac, and covering the distance in 1 hour 12 minutes. The L. L. Moore cup was the prize in this race.

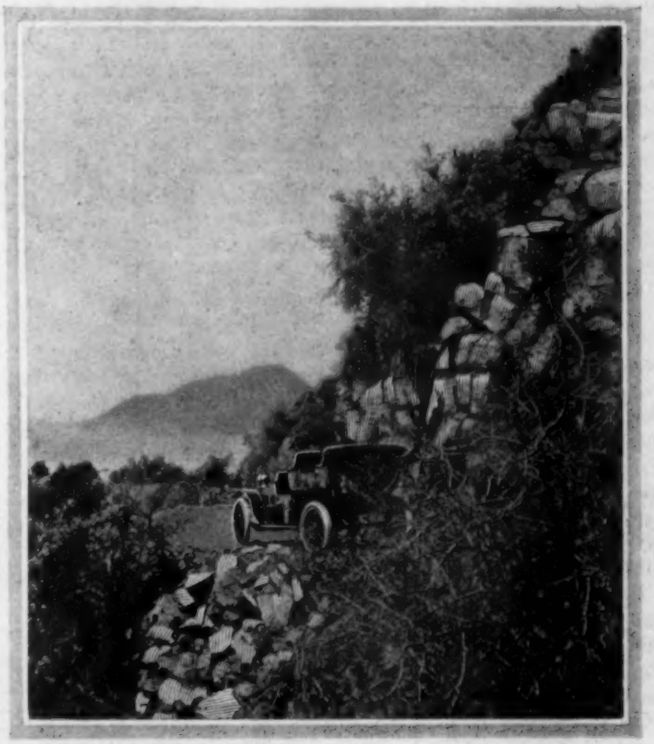
HOW AN OHIOAN UTILIZES HIS CAR.

Col. Webb Hayes, of Fremont, O., recently struck upon a rather novel use to which he has been putting his automobile on the famous old homestead of ex-President Hayes. Instead of using a large work horse to mow the lawn, he uses his two-cylinder Reo with a 36-inch lawn mower. His car also furnishes the power for a two-horse scraper and a two-horse iron wheeled wagon to haul rubbish, brush, etc., in. Col. Hayes says that the work is done much more rapidly and easily than with horses. When doing the "lawn stunts" he removes the detachable rear seat in his car, which is a trick requiring but a minute's time, and the car becomes the motive factor of the mowing machine.

WHITMAN TRIES MOUNTAIN CLIMBING.

L. L. Whitman, the famous transcontinentalist, not content with having snowed under all cross-continental records so deeply that it will probably be years before any attempt is made to better his performance, has a hankering for new fields to conquer and has tried his hand at mountain climbing. The accompanying photograph shows the little air-cooled Franklin at the summit of Mt. Wilson, 6,000 feet above sea level; but that Whitman rather tends to the opinion that mountain-climbing, at least of this variety, is somewhat more hazardous than record-breaking on the level is shown by the following, taken from his letter detailing the performance: "The only road consists of a measly little burro trail that had been widened to permit of taking supplies to the top for a hotel and an observatory being built there. As the reconstructed trail was just wide enough to run a small Franklin car on, R. C. Hamlin and myself were fools enough to want to be the first to drive an automobile up it." Regarding the drive itself, he says:

"On the morning of May 28, at daylight, we hit the trail, and after three hours of strenuous work were at the summit—a ten-mile drive, with a good portion of it soft, mealy road, so that it was a case of low speed all the way, and plenty fast enough for me at that, as we crawled along the side of the mountain and looked down 500 to 1,000 feet right off the end of the hub. Some of the turns were so short that we had to 'see-saw' the corners. Half way up we ran into the clouds, and at the summit we were well above the clouds, with the mountain peaks sticking up out of the vapor like so many rocky islands in the sea. We had three miles of driving through the cloud bank, and the moisture gathered on our clothing to such an extent that we were as wet as if we had been caught in a shower. It was a mighty hazardous trip, but we went very slowly, though the view of some of the dizzy heights, with the tall trees looking like so many toothpicks on end far, far below, made our hair start a little—on the bald places. As soon as the authorities saw what we were up to they closed the trail against further attempts of a similar nature, but not in time to prevent us making the trip successfully. It was a mighty stiff and difficult climb every foot of the way, and we certainly should not recommend it as a pleasure trip."



WHITMAN'S FRANKLIN CAR ON MT. WILSON'S SUMMIT.

THE AUTOMOBILE

Vol. XVI Thursday, June 13, 1907 No. 24

THE CLASS JOURNAL COMPANY,

Flatiron Building, Madison Square
New York City

H. M. SWETLAND, President

EDITORIAL DEPARTMENT:

A. G. BATCHELDER, Managing Editor
R. F. KELSEY, Associate Editor C. B. HAYWARD, Engineering Editor
W. F. BRADLEY

BUSINESS DEPARTMENT:

A. B. SWETLAND, Business Manager
L. R. SMITH FRANK B. BARNETT
W. I. RALPH, 1035 Old South Building, Boston, Mass.
C. H. GURNETT, H. H. GILL, 836 Monadnock Block, Chicago, Ill

Cable Address - - - - - - - - - - - - Autoland, New York
Long Distance Telephone - - - - - - - - 300 Gramercy, New York

SUBSCRIPTION RATES

United States and Mexico - - - - - - - - - - - One Year, $2.00
Other Countries in Postal Union (including Canada) - - One Year, 3.00

To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-office or Express Money Order, or Register your letter.

FOREIGN SUBSCRIPTION AGENTS:

ENGLAND:—Iliffe & Sons, Limited, 20, Tudor Street, London, E. C
FRANCE:—Boyveau & Chevillet, 22 Rue de la Banque, Paris.
GERMANY:—A. Seydel, Mohrenstrasse 9, Berlin.

Copyright, 1907, by The Class Journal Company.
Entered at New York, N. Y., as second class matter.
The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly).

Copies printed	in 1905,	730,000
"	in 1906,	791,000
"	This Issue	16,000
"	Since January 1,	391,150

Great Worth of Road-building to Automobiling. It is an old, old story—this talk of good roads and their great worth to a country. France and Britain and other European countries realized the fact centuries ago, with the Romans having been the first to construct highways deserving of the name. Various causes have delayed and interfered with good roads in this country, and, spasmodically, we have accomplished comparatively little except in a few States like New Jersey, Massachusetts, Connecticut, and Rhode Island. Though the one to benefit most, the farmer as a class has been antagonistic rather than favorable to the improvement of the roads, accusing first the cyclers and now the automobilists of working for good highways for their own selfish use, losing sight of the fact that all vehicle owners would have the same opportunity. It may be that the farmer feared that the coming of good roads might—and did, of course—mean increasing cycling's army and consequent annoyance to the owners of horse-drawn vehicles, who seemed to think that the roads belonged to them and there was no call to share with any new conveyance. The same attitude is taken in reference to the automobile except in sections where the farmer himself has become an owner and is comprehending the great boon to him of the motor-driven vehicle.

A man who did conscientious work as commissioner several years ago with the government's Office of Public Road Inquiries was James W. Abbott, who not long since expressed his views in these columns, dwelling particularly upon the results that should follow a national association of all automobile bodies, saying that the time had come for the automobilists to make the roads question their question. But all interests that would be peculiarly benefited by road betterment should have representation. In the *Pacific Rural Press* of California the Abbott article was reprinted with these comments:

"The policy or statesmanship of Mr. Abbott's suggestion lies in confidence that the automobile is the coming agricultural vehicle and motor. Therefore, though now initiative is needed from other interests, as he suggests, the effort will continually recruit itself from the ranks of agriculturists until what is a most conservative element may become an effective promotive agency."

The various automobile bodies—N. A. A. M., A. L. A. M., A. M. C. M. A., A. A. A., A. C. A., and A. M. L.—are now perfecting an organization, but it certainly seems most advisable to invite the membership of all other associations interested in the building and use of the roads, especially the agricultural element, which should be consulted and be called upon to have a strong voice in the proceedings—or at least have opportunity.

✹

Grade Crossings the Greatest Menace. Ever since the railroad became a factor in daily life the grade level crossing has taken a constantly increasing toll, and though millions are being spent to eliminate this greatest of all road dangers on steam railways, the trolley has come to complicate the problem so that there has been little actual improvement. Experience has shown that two objects, proceeding toward a common point from different directions, will all too frequently reach it simultaneously, despite their widely varying speeds.

It did not take long to establish this as a fact, and thousands have since been killed in substantiation of it, and still the grade crossing fatality is the greatest of all risks to the autoist as well as the driver of a horse. This being so, it behooves both to exercise the greatest of caution in approaching and crossing such points. The warning to "Stop, Look and Listen" that cost such a large amount of money in Pennsylvania to establish is not a whit too strong. If its admonition were heeded oftener there would be fewer deaths to record. Whether it be danger in this form, a blind turn on a country road, or a long shot at squeezing through a bad place in city traffic, the average autoist is always willing to take chances. It is a specious form of overconfidence born of an intimate knowledge of the great capabilities of the machine, and sooner or later it ends in disaster; most frequently in front of a railroad train. Perfect control and absolute confidence in his machine are two requisites of the good driver, but the autoist who so far abuses them as to take chances at a grade crossing places himself in the same class as the man who rocks the boat and the idiot who "didn't know it was loaded."

✹

South America as a Market for the Automobile. On few subjects is the average American business man so poorly informed as with regard to the wealth and resources of South America—not future and more or less remote—but actual and present. The man in the street has absorbed the popular notion that, as a whole, the continent that lies to the southeast of us is a measly collection of poverty-stricken republics whose chief, if not only product, is dissension in the shape of frequent-recurring revolutions. Nothing could be further from the reality. It is indeed true of those small sections that form a connecting link between the Mexican border and Colombia, but the area of these countries in the aggregate bears about the same proportion to South America as Rhode Island does to the entire United States.

Brazil, the largest, is considerably greater in area than the United States, and Uruguay, the smallest, represents the equivalent of several good-sized States. Rio de Janeiro and Buenos Ayres are cities of more than a million inhabitants each, and there are numerous others of only slightly lesser importance. That their wealth is proportionate to their size is evident from the number of automobiles already in use. But the majority are of European make and show that the overseas builder has been alive to his opportunities in this direction. It behooves the American maker to do likewise, and the results already gained give some idea of the reward that awaits a live endeavor.

GLIDDEN CARS TO CARRY NAMES ON FLAGS.

Owing to the fact that the touring board of the American Automobile Association has been in receipt of numerous letters asking how cars on the tour are to be distinguished by spectators along the route, it has been found necessary to make a radical departure from the rule prohibiting makers from displaying any form of advertising. This rule remains in force as usual, but as it has come to light that practically every one interested in the tour is likewise interested in some particular make of car and is anxious to know when it passes, the touring board has decided to provide each car with two small pennants, to be placed on each side of the front seats or the dash, bearing the name of the car. By taking this mattter in hand neatness and uniformity in the identification marks will be atttained and the display of garish and unsightly banners prevented. The pennants will be about three feet long, with the lettering in black or red on a white field, though this detail has not yet been decided upon.

Seven additional entries have been received during the past week, bringing the total thus far up to twenty-seven. Three of the newcomers are touring cars and four are high-powered runabouts, the details of the new entries being as follows:

Car No.	Entrant	Address	Club	Car
19	G. A. Weidely	Indianapolis		24 h.p. Premier
21	T. P. Jones	Pittsburg,	P. A. C.	45 h.p. Pierce Great Arrow
25	A. B. Tucker	New York,	N. Y. M. C.	26 h.p. Dragon
100	A. E. Hughes	Philadelphia		45 h.p. Pierce G. A. Runabout
101	C. A. Coey	Chicago	C. A. C.	60 h.p. Thomas Flyer "
102	H. E. Coffin	Detroit	A. C. of D.	40 h.p. Thomas "Forty" "
103	H. O. Smith	Indianapolis		24 h.p. Premier "

A Newcomer from Michigan for the Tour.

GRAND RAPIDS, MICH., June 10.—Albert E. Meenges, who is building a new car, will enter it in the A. A. A. tour. He hopes to be able to enter two machines, if he can get the second one completed in time.

AUTO DUTIES IN NEW GERMAN TREATY.

WASHINGTON, D. C., June 10.—Under the new commercial agreement entered into with Germany, and which will go into effect on July 1, 1907, remaining in force for one year, the duties to be levied on American motorcycles and automobiles exported to Germany will be as follows: The duty is based solely on the weight, and in the case of motorcycles ranges from 70 marks to 100 marks per 100 kilos, the first figure applying in the case of machines weighing 50 kilos or less, while the last applies to those weighing from 100 to 250 kilos, an intermediate class being taxed 75 marks per 100 kilos. On automobiles the duty is 15 to 40 marks per 100 kilos, and the machines are also divided into three classes: over 1,000 kilos; from 250 to 500 kilos, which pay 25 marks, and from 250 to 500 kilos, paying 40 marks, the mark in each case being figured as the equivalent of 23.8 cents. This forms part of the temporary agreement entered into in order to adjust the commercial relations of the countries until a comprehensive commercial treaty can be agreed upon.

LICENSE SUSPENDED FOR PASSING WRONG SIDE.

BOSTON, June 10.—The first case of the suspension of an operator's license for infraction of the rules of the road occurred when the Highway Commissioners suspended for two weeks the license of John R. McPherson, of Boston, a professional chauffeur. The charge against him was passing a carriage moving in the same direction as the automobile on the right of the road and the right of the vehicle. The Highway Commission has made knowledge of the rules of the road an important requirement in its new chauffeurs' examinations, and it apparently intends to enforce these rules as strictly as the automobile law.

A line of frontier autos is about to be opened between Russia and Germany, both governments consenting, on the Liban to Memel route. The 'buses carry sixteen passengers, and are of German manufacture.

BLAZING THE WAY FOR THE INVASION.

BY GEORGES DUPUY.

MENTON, FRANCE, May 29.—Two thousand miles over the roads of France and Germany, under the blue skies of Italy and around the snow-capped hills of the Tyrol, will soon be the record of the Yankee Stearns. Two hundred kilometers a day is proving a bigger strain on man than on machine, for since coming here the celestial sluice gates have been wide open, and every night finds us soaked in body and spirit. Despite it all, the excellent roads have made motoring not only possible, but have allowed of fast travel.

Out from mountainous Bourg Lastic, where the villagers are still talking of the Pope-Toledo that smashed a farmer's cart before the Gordon Bennett race, to wine-famed Bordeaux, the 248 miles were covered in record time. Down from Bayonne to Biarritz, a distance of 310 kilometers, the Stearns groped along in the inky blackness of night.

In the high mountain villages, where representatives from other lands are not daily visitors, crowds gather around the Stearns night after night and examine it in detail, discussing its self-imposed task and comparing its lines with the more familiar French, German and Italian machines. In the big touring centers the native has a keen appreciation for a good machine, and is showing amazing interest in the forerunner of the Gold Cup party. Those who will join the travelers later will find that the route lies through the most picturesque and interesting spots of Europe that have still the marks of ancient history, not only in the architectural beauties of the place, but in the characteristics of the natives.

To-night, from my attic window overlooking the Allées de Tourney, a good dozen trickling umbrellas are mournfully going up a perpendicular street that leads to a black stone church—but here I stop, at any rate so far as the church is concerned. To-morrow we shall be out on the broad, free highway.

DEALERS CLAIM SELDEN SERVICE INVALID.

Following the action of the upholders of the Selden patent in beginning suit against a number of local dealers handling independent cars, some of the latter have disputed the validity of the service made upon them as agents in law of the makers they represent and made a motion to set aside the service. The motion came up for argument before Justice Hough, sitting in the U. S. Circuit Court on Friday last, the actions being in the name of the Electric Vehicle Company *vs.* the A. L. Kull Automobile Company, the National Motor Vehicle Company, Homan & Schultz, representing Thomas B. Jeffrey & Co., and others, only the first being reached on the calendar.

Argument in favor of the granting of the motion was made by Frances Rawle, of counsel to the Dragon Automobile Company, Philadelphia, on the ground that the latter and the A. L. Kull Automobile Company were in no way connected other than as buyer and seller, though Mr. Betts, senior counsel to the plaintiffs in the action, stated that it had come to his knowledge that morning that the officers in both companies were the same. His principal contention, however, was that the U. S. Marshal's return could not be traversed on the hearing of a motion—an opinion with which the court was not at all in accord, but consented to direct a reference to hear argument on this technical point of procedure, as well as on the main point of contention.

PARDINGTON ONCE MORE AT THE HELM.

During the absence of Chairman Jefferson DeMont Thompson, of the A. A. A. Racing Board and Vanderbilt Cup Commission, in Europe, the man at the racing helm will be A. R. Pardington, who was the second chairman of the A. A. A. competitive department. While Mr. Pardington is well occupied with Long Island Motor Parkway affairs, it is assured that A. A. A. racing matters will not be neglected. Usually one goes to the busy man to get things done, and that is the case in the present instance.

FOURNIER ON EMPEROR'S RACE.

It is to-day that the elimination trial for the German Emperor's cup will be decided on the Taunus Circuit. On the following day the forty survivors will compete in the final over the same course. So much has been written about the dangerous nature of the Taunus circuit and so much criticism directed against the organization and the recent decision to make the event a two-day race, that it is interesting to hear the views of an impartial contestant.

Henry Fournier, who has just returned to the racing game after several years' absence, and who will drive an Itala in the German event, has spent five days on the circuit and has been round it fourteen times. The road, he declares in *Les Sports*, is less dangerous than the Auvergne circuit, but will probably be more perilous on account of the number of cars and the percentage of less experienced drivers.

"The organization is perfect. It is better than anything we have ever seen in France or elsewhere. An enormous amount of work and the expenditure of a few hundred thousand marks—probably half a million—is the whole secret of its success. Already driving licenses and custom formalities can be arranged at the A. C. F., giving the right to pass free into Germany and avoiding all trouble at the frontier. Count Sierpstorpff, the organizer of the course, relates that one of the French drivers, Duray, I think, was detained at the frontier. The newspapers heard of it, and next morning there was a telegram from the Emperor to the Automobile Club: 'Are such stupidities possible in Germany? Advise.' Two days later all was settled.

"You are not asked to admire everything that has been done. You are told to go on the circuit, study it closely, search for defects, and report whatever you find to be unsatisfactory. You are then given permission to run on the course. Your number is painted in enormous letters on the front and rear of your machine, you are given the practice regulations, printed in your own language, with the dates of all the country markets and a note asking you to pay close attention to them. You are further informed that after 8 o'clock in the morning it is forbidden to use a racing machine, and at every curve there are large white stones visible for a long distance, leaving room to pass but preventing all speeding. I have often seen these stones rolled into position. Every morning at the same time throughout the 74 miles of the course the stones are placed.

"The policing of the course for practice work is perfect. I have been round fourteen times on an Itala and have not met either a child or a dog. Already the villages are barricaded, leaving a guarded street on each side in which the children can play. An enormous amount of work has been done at the starting point, grandstands being at the foot of a hill giving a view of six kilometers of road. There are certainly better roads and less dangerous ones, but it is certain that a poor car could not win, especially the second day. From one end to the other the surface is good, indeed of such a nature that one might call it a race track. From the starting point to Homburg the road is 32 feet wide. From here to Oberursel it is a series of streets rather than a road, where it would be impossible to pass a rival if he wished to keep you in the rear. Luckily, however, it is only eight miles long. From Koenigstein to Esch the road is good but terribly hilly. Unfortunately the new road avoiding Limburg and Weilburg is exceptionally narrow and winds continuously. On one side is the river, on the other the mountain; not even a grassy bank on which to pass.

"As for the turns, they start at the beginning and continue throughout. From Dornholzhauser to Oberursel nothing but sharp turns. At Koenigstein a sharp turn to the left followed by a steep grade. At Esch is the beginning of a zigzag. It is so dangerous that, paradoxically, it ceases to be dangerous. There are not even 600 yards in a straight line; perhaps not 200. You just jump from one turn to the other, with as much judgment as possible, without any necessity for braking, but continually cutting out and opening up. For the motors it is terrible. At one spot you run between two high walls of earth and make such a sharp turn that there is not a yard to spare if the car is not taken round perfectly. A little later is a second turn of the same nature, both of them on a grade which has certainly 15 per cent. Some declare that it is 18 per cent., but I would not swear to this. One thing I am sure of, I have never seen anything like it in my life."

FIVE START ON PEKIN-PARIS RUN.

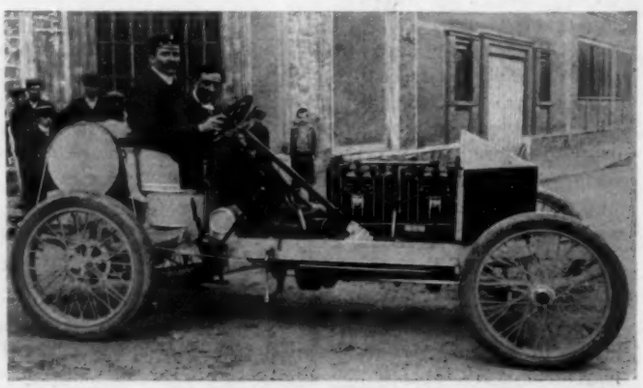
A cable report from Pekin announces that five automobiles left that city on June 10 for Paris on the 9,300-mile endurance trip, which will break all records for length and originality. Two De Dion Bouton touring cars, piloted by Cormier and Collignon, and a Contal tri-car in charge of Pons, represented France. A Spiker was the single Dutch representative, and Prince Borghese carried Italian colors on an Itala. An enthusiastic send-off was given the small party, a French military band speeding them away with gay selections of music, and foreign ministers and residents wishing the bold travelers all possible good luck. Cormier calculates that they will average less than 100 miles a day.

CHRISTIE OFF TO CAPTURE GRAND PRIX.

After a temporary delay on the dockside, owing to the unwillingness of the steamship company to accept Walter Christie's boxed racing automobile, the American champion for honors in the French Grand Prix, to be run on July 2, was hoisted aboard the *Majestic* last Wednesday. Walter Christie, Louis Strang and the front-drive machine will land at Southampton on June 19. The racer will be immediately uncrated, will cross the Channel for Havre by a steamer leaving the same evening, and will travel by road for the Dieppe circuit without delay. Before sailing Walter Christie declared that the machine had been put into thorough racing trim, and that it would not be used for practice work on the course. A touring machine will be employed to enable the driver to become familiar with the circuit.

DARRACQ RACERS FOR GRAND PRIX RACE.

PARIS, June 1.—For the Grand Prix race, to be run next month, the Darracq firm will use last year's machines, modified to suit the new conditions. It is not yet known whether there will be two or three Darracq racers in the contest, the machine recently sold to M. Heriot having been considerably damaged in the accident which cost Marius Pin his life. Two, however, are certain

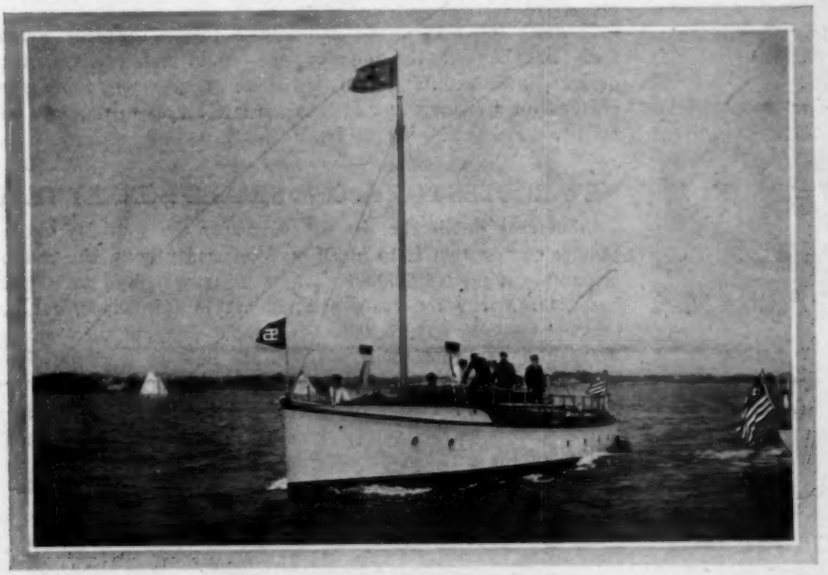


CAILLOIS IN NEW DARRACQ GRAND PRIX RACER.

starters—one to be driven by Caillois, who last year had charge of a Thomas in the Vanderbilt race, and the other possibly by Demogeot. There is a rumor that a well-known sportsman, who has bought the third Darracq racer, is endeavoring to obtain the services of Théry, twice victorious in Gordon Bennett races, to return to the racing game as a Darracq driver. Confirmation of this has not yet been obtained.

AILSA-CRAIG WINS THE BERMUDA RACE

AT the boom of the starting gun at 4:10 P.M., on Saturday, June 8, two trim motor craft passed over an imaginary starting line in the Narrows and headed for distant Bermuda, nearly 800 miles away. Slight mishaps had delayed the start and caused a change of programme. On Friday it was found that the *Ailsa-Craig*, built for Eben Stevens, could not be fitted out in time for the noon start from the Scotland Lightship, and it was then determined to send the boats away from the Narrows at a later hour. Meanwhile, at the Motor Boat Club float, on the Hudson, the *Idaho*, her competitor, was being delayed by the absence of one of her crew. A willing substitute was soon found, and when all was ready the little craft swung her anchor aboard and followed the pilot boat *Raymond* down stream in search of her seagoing companion and competitor.



AILSA-CRAIG (CAPTAIN MUELLER), THAT WON THE NEW YORK-BERMUDA RACE.

There have been longer motor boat trips than the present one from New York to Bermuda, notably when two American boats, the *Abiel Abbott Low* and *Gregory*, crossed the Atlantic; but in that case the boats were under cruising conditions, whereas the *Idaho* and the *Ailsa-Craig* are under the necessity of going all out. As a test of the seaworthiness and reliability of the motor boat, no competition has ever been held equaling it in strenuousness.

Additional interest is added to the race by the fact that the two boats are of very dissimilar types. The *Idaho*, designed and built by Stearns & McKay, of Marblehead, Mass., for Peter Shields, of Cape May, N. J., is 60 feet over all, 53 feet on the water line, 12 feet 3 inches draft. The motor is the regular four-cylinder 25-horsepower Standard, 6-inch bore by 8-inch stroke. Having been built for use in the shallow waters around Cape May, and only slightly modified to fit for the Bermuda race, her hull is not of heavy construction. Temporary gasoline tanks, bringing the fuel supply to 1,200 gallons, have been fitted, so there is no fear of shortage. The boat is steered from the bridge on the cabin top, and a long tiller for emergency use may be fitted direct to the rudder head. The bow of the *Idaho* has a moderate rake forward, and the bow sections have a decided flare above the water line. To comply with the regulations a mast has been stepped through the forward part of the cabin top and carries a loose-footed gaff sail; a staysail has also been rigged.

The *Ailsa-Craig*, owned by James Craig, Jr., and Eben Stevens, has been specially constructed to meet the requirements of the Bermuda race. Her designers, A. Cary Smith & Ferris, of New York City, have made her as long as possible to come within the limits of 60 feet, giving her a plumb bow and plumb transom stern, with the rudder hung outboard. The aim has been to produce a boat which could be driven at a high speed in a seaway. She has an unusually high freeboard.

Both Boats Reach Bermuda Safely.

On time allowance *Ailsa-Craig* was victorious in the Bermuda race by 1:16:22. Her actual running time was 64:49:0, compared with 75:2:0 for her rival, *Idaho*. The Craig boat, however, had to accord 8:56:38 time allowance. On the trip from the Lower Bay, New York, fair weather was experienced until Monday night, after which strong westerly winds and rough seas were the order of going. The *Ailsa-Craig* stood up well against the heavy seas, and only stopped once, when the weather had moderated, to shift an igniter. The voyage brought to light but one defect, the insufficient ventilation of the engine room, which made the work of the engineers particularly arduous. Thomas Fleming Day, who was in charge of the *Ailsa-Craig*, is loud in the praise of his craft, and declares the voyage a success in every way. Five hundred and fifty gallons of gasoline were consumed on the trip. The skipper of the *Idaho* also reports a highly successful trip. From the first the boat fell behind her more powerful rival, and was five miles astern when they lost sight of one another at nightfall. Rough weather was experienced, but the boat proved herself remarkably seaworthy, and no trouble was met with.

THE IDAHO (CAPTAIN ROBERTS), THAT FINISHED IN SECOND PLACE.

NEWS OF THE CUP RACERS.

Herbert Lytle is to be entrusted with the Pope-Toledo racer, and from the Pope Company comes this information: "We have had any number of applicants to drive our two cars, the racer and the Type XV runabout, in the Vanderbilt race. If we

BERT LYTLE ON HIS NEW POPE-TOLEDO CUP RACER.

made known the names of some of the big race drivers who were after these plums, there would be some new names slated to drive, but we have faith in Lytle. He is the most fearless driver we know and handles a car better. Lytle does not appear to have a nerve in him; he has never been known to lose his self-control, and he has, perhaps, taken more hairbreadth chances than any other driver of an automobile. In fact, Lytle hungers after the dangerous."

From Freeport, Ill., comes information from the Shoemaker Automobile Company that it is constructing a four-cylinder 70-horsepower racing car, weighing only 1,650 pounds, with shaft drive and selective type transmission. The company has great faith in its creation and expects to have it on the roads for trying out in the near future. The same concern intends to enter its 40-horsepower car in many of the important regualr stock car contests.

Commenting upon racing, E. R. Thomas says: "I not only favor international stock car contests as well as contests on the order of the Vanderbilt Cup race, but consider them absolutely indispensable for the further mechanical and constructural betterment of our automobiles. Endurance runs, tours and road work of all kinds are bound to teach us points, but they cannot compare with speed trials as a source of lessons. The Vanderbilt Cup race shows us the materials to use, the way to design our cars, and what they will stand. International touring car races give us an opportunity to show whether we have taken the proper advantage of those lessons. Not only should the manufacturer encourage such affairs, but he should know that the public has a right to demand them. The more discriminating buyers have come to realize that races such as the Vanderbilt and such as an international stock car race would be are for their benefit as well as that of the man who makes the cars. They have come to see that it is by such means almost entirely that the maker gains the experience that enables him to improve his product, and they know, too, that every race of that kind means money to them, since they can get a better car than before the manufacturer had his racing experience."

When interviewed on the subject of the Vanderbilt Cup race, Henry Rawle, general manager of the Dragon Automobile Company, said that the situation did not worry the Dragon company, as it had supreme confidence in the A. A. A. Racing Board. Said Mr. Rawle:

"The Racing Board is composed of men of the highest caliber who have the interest of the automobile at heart. They realize that the Vanderbilt is the premier automobile sporting event of the world, and it is my opinion that they will run the race if there is any way in which it can be brought about.

"Regarding the proposed changes in the rules, we have nothing to say. We designed, and are building our cars under the specifications of previous Vanderbilt races, and we feel sure that the cars will give a creditable account of themselves in any event.

"I don't say that, if we had known that a different weight limit was liable to be imposed, we would not, perhaps, have designed a little different car, but there are probably some good reasons for a change, and as it is too late for us to redesign our cars, we are not going to let it worry us."

NEW ROUTES FOR A. C. A. SEALED BONNET TEST.

In making public the list of routes for the four-day Sealed Bonnet contest that is to begin on Wednesday next, the contest committee of the Automobile Club of America figured without its host. Ordinarily the roads selected are in fair shape, but the backward season has caused considerable delay in their annual overhauling, so that road repairers are now at work on them and many are in an almost impassable condition. It is not the intention of the sponsors of the run to make it in any sense a test of endurance, but rather to demonstrate the mechanical perfection of the cars, so that a complete change in the route has been found necessary in order to provide a proper course on which to drive the 600 miles required by the four days of the contest.

As now mapped out, the first day's route will consist of a 150-mile run on Long Island, starting from Long Island City; on the second day the same distance will be covered over the State roads up through White Plains, Mount Kisco, Bedford, and Cross River to Danbury, Conn., and return. For the third day's run the shore road to New Haven and return has been selected, while the fourth day's run will be a repetition of the first.

Since making the former announcement additional entries of a 60-horsepower Thomas Flyer, a 45-horsepower Pierce Arrow and a 30-horsepower Aerocar have been received, bringing the total thus far to 17 cars. Owing to the change in the route, the committee has extended the date for receiving entries to June 15. The entry list at the present writing is as follows:

CLASS A, CARS SELLING AT OVER $3,000.

American Locomotive Company (Berliet), one touring car.
Loxier Motor Company, two touring cars.
Locomobile Company of America, three touring cars.
Wyckoff, Church & Partridge, Stearns touring car.

CLASS B, CARS SELLING FOR $1,500 AND LESS THAN $3,000.

George J Scott Motor Company, one "Glide" touring car.
A. M. Day, one "Elmore" touring car.
Locomobile Company of America, three touring cars.
Atlantic Motor Car Company, one "Stoddard-Dayton" touring car.
Atlantic Motor Car Company, one "Stoddard-Dayton" runabout.
Harry S. Houpt, one "Thomas Flyer" touring car.
Harrolds Motor Car Company, one "Pierce Great Arrow" touring car.
A. M. Robbins, one "Aerocar" touring car.

U. S. M. R. A. ARRANGES A TRACK CIRCUIT.

A twenty-four-hour race for stock cars is to be the feature event of the meet to be held at the Brighton Beach, N. Y., track, August 9 and 10. The United States Motor Racing Association, of which Joseph M. Gaites is the president, will be the promoting body. The same association has applied for the following dates for circular track meets in various parts of the country

June 21-22....Detroit, Mich.	July 12-13....Chicago, Ill.
June 28-29....St. Paul, Minn.	July 19-20....Indianapolis, Ind.
July 3-4.....St. Louis, Mo.	July 26-27....Pittsburg, Pa.
July 6.....Milwaukee, Wis.	Aug. 2-3.....Providence, R. I.
July 10.....Cleveland, O.	Aug. 9-10....Brighton Beach, N. Y.

ORPHAN'S DAY PREPARATIONS BY THE CLUBS

Quaker City Motor Club to Entertain 1,500 Orphans.

PHILADELPHIA, June 10.—Last Thursday night's meeting of the Quaker City Motor Club was a busy one. Besides the routine business, there was outlined for the coming four weeks a programme which will keep the members quite busy. First in order comes the Orphans' Day run, Wednesday of this week. Then comes the club's first meet of the season, June 28-29. Following this, July 3, will be a reliability run to Wildwood, N. J., with races on beach and boulevard on the 4th. July 14 the club will help entertain visiting Elks.

The Orphans' Day affair is a sure success. Already 125 cars are promised, with additions to the list in each incoming mail. Chairman George H. Smith expects at least 200 cars, which will assure an outing for 1,500 of the parentless little ones. Willow Grove will be the objective point of the outing, and the officials there will throw open all the attractions to their little guests free of charge, besides which there will be a red-letter feed provided by the club.

The feature of the two-day meet which wil be pulled off at Point Breeze track will be a 24-hour race, the similar event held a fortnight ago under the auspices of the United States Motor Racing Association having proved such a winner from a sporting viewpoint, if not financially, that there have been insistent demands for a repetition. Besides the headliner, there will be five and ten-mile city championships and two other short-distance events.

The "Over-the-Fourth" outing of the Quakers is the outcome of an invitation from the Wildwood (N. J.) Board of Trade to participate in a race meet on the national holiday, and to give the tourists something to think about on the down trip, on the afternoon of the 3d, the Wildwooders have promoted a reliability run, with special prizes for the clubmen and for outside automobilists as well. Of the eight events on the 4th, which will be run off over the new two-mile-long boulevard, two will be for Quaker members only, to insure a fair amount of plunder for the clubmen.

The Elks reception run, on July 14, will be in the hands of a committee consisting of J. R. Potter, C. E. Shreve and A. T. James, who will outline an itinerary which will give the visitors the best idea of Philadelphia's attractions from an automobile viewpoint.

Harrisburg Hill-Climb for Stock Cars Only.

HARRISBURG, June 10.—Details of the forthcoming hill-climb to be held under the auspices of the Harrisburg Automobile Club on July 4, which will be the first event of the kind fostered by this organization, are now forthcoming. There are to be eight events on the program, and all of them are to be confined to stock cars solely, any special preparations in the way of stripping them of bodies or using special gearing being barred. There will be three prizes for each event, consisting of gold, silver and bronze medals, a silver cup being awarded in addition for the best time of the day. Classes 1 and 2 are for Harrisburg touring cars and runabouts regardless of price, the other classes being graded, Class 3 being for cars costing $1,000 or under, Class 4 up to $2,500, Class 5 up to $4,000, Class 6 up to $6,000. Class 7 is to be for motorcycles within a radius of 30 miles of Harrisburg, and Class 8 is to be a free-for-all.

Secretary Pierce Resigns from Binghamton Club.

BINGHAMTON, N. Y., June 10.—At a meeting of the Binghamton Automobile Club held last week the resignation of Alderman Norman M. Pierce, as secretary of the club, was accepted, and Mr. Pierce was unanimously elected an honorary member. His resignation is due to the fact that he is shortly to become a resident of Buffalo. S. M. Frechie, the treasurer, has been appointed as secretary, thus combining the two offices. Twenty-eight new members were admitted at the last meeting.

Buffalo Will Celebrate Its Orphans' Day June 26.

BUFFALO, June 10.—At its last regular meeting the board of directors of the Automobile Club of Buffalo has decided to make Wednesday, June 26, Orphans' Day, and has already issued a request to its members to donate the use of their cars for that day for the purpose of providing enjoyment for the many children which it expects to accommodate. Last year's showing was a substantial one, and it is anticipated that the precedent set by the old guard of the club in this direction will prove a strong incentive to the remainder of the club members to make an unprecedented success of the affair.

On Friday last the membership committee of the club held its regular meeting, and the report made shows the club to be in a flourishing condition. On the occasion of its last meeting on May 4, 66 applications for membership were received, but at this meeting no less than 95 were acted upon, bringing the roster up to a total of 806 members, the rate of increase being so rapid and so consistent that it is confidently expected to reach the 1,000 mark by August 1, when an initiation fee will be charged. The club's efforts to facilitate touring in Canada have finally been successful, it now only being necessary to pay a fee of $5 for the customs and bonding and $4 for the Ontario license and markers, the secretary taking charge of these details when requested to do so. This result represents the work of a three years' campaign. In connection with its work of regulation, eleven prominent members have just been sworn in as special policemen to put down speeding and reckless driving. To further this end their identity is kept secret.

The Automobile Club of Buffalo has just completed arrangements with the Canadian government for American tourists desiring to take their cars into Canada. Those desiring to cross the border with their cars may do so for the remainder of the present year by paying $5 for the customs, bonding, etc., and the Ontario vehicle permit and markers cost $4 additional.

Bridgeport Club to Repeat Hill Climb.

BRIDGEPORT, June 10.—As a result of the great success attendant upon the recent hill-climb up Sport hill on Memorial Day, the Automobile Club of Bridgeport voted to repeat the event on next Labor Day at its regular meeting last week. So much interest was shown that it is thought there will be no difficulty in making the event one of importance to the State as a whole, and efforts will be undertaken to interest the Board of Trade and city officials after the manner adopted at Wilkes-Barre in connection with the Giants' Despair hill-climb there. Reports were received from Ralph Sperry, chairman of the hill-climb committee, and A. L. Riker, referee, showing that the event was a financial success, also that no protests were recorded. It was voted to continue the same committee in office. R. D. Crawford, who drove the Stevens-Duryea Big Six up the hill in 1:32 3-5, was awarded the Yale cup for the amateur driver making the best time in a gasoline car, and has offered the cup as a perpetual challenge trophy to be raced for on Sport hill only.

Active preparations for the celebration of Orphans' Day have been under way for a week past, and culminated yesterday in a trip to Savin Rock by 20 odd cars, carrying between 60 and 100 waifs.

Atlantic City to Hold an Auto Carnival.

ATLANTIC CITY, June 10.—Commencing the week of August 5, Atlantic City is to hold an automobile carnival. On August 5 and 6 there will be a two-day race meet on the beach course at Ventnor under the auspices of the Atlantic City Automobile Club, which has already held two very successful meets on this course, some world's records having been established on the fast straightaway sand stretch of a mile. On Wednesday, August 7, there

will be a grand floral parade along the seven-mile stretch of asphalt of Pacific avenue, with a reviewing stand at the City Park. Silver cups and other prizes are to be awarded, and it is anticipated that there will be a large entry list from Philadelphia and New York. The carnival will end with a three-day automobile exhibit on Young's pier, which is said to be the finest of its kind in existence. The event is being promoted by the Atlantic City Carnival Corporation, composed of the town's leading business men, including Walter E. Edge and Harry Cook, both of whom are well known in New York.

Ohio Valley Autoists Gain a Victory.

WHEELING, W. VA., June 10.—Through its secretary, T. A. Westmyer, the Ohio Valley Automobile Club has been able to score a decisive victory over the toll-gate keepers of eastern Ohio. Up to the rendering of the decision in their favor at St. Clairsville last week, tourists from outside of Ohio have been compelled to pay a toll of five cents a mile, while residents were only taxed half that sum. There has been much dissension between autoists and toll-gate keepers in the past over this matter, sometimes almost coming to blows, but naturally the keeper always got the best of it. The club decided to make a test case and have the thing decided once for all, and to do so had members run through some of the gates, with the result that 2 1-2 cents has been declared to be the legal rate for all alike.

Minneapolis and St. Paul to Hold Joint Race Meet.

MINNEAPOLIS, MINN., July 8.—Arrangements are being completed by the Minneapolis and St. Paul Automobile clubs for the holding of a meet June 28 and 29 on the State Fair Grounds track at Hamline, midway between St. Paul and Minneapolis. H. W. Pickens, manager of the United States Racing Association, signed up contracts whereby that association will furnish drivers for the speed contests. One of the feature events will be a 24-hour endurance contest. The Twin City cup, now held by St. Paul, will be competed for.

The Minneapolis Automobile Club has offered a reward of $100 for the conviction of any person stealing a machine owned by any member of the club. It has also expressed its willingness to cooperate with the police department in suppressing the scorcher.

Cordial Relations with Public Characterize Geneva Club.

GENEVA, N. Y., June 10.—The Geneva Automobile Club, with a present membership of sixty, is in an exceedingly healthy condition. One of the lines of conduct of the club has always been the enforcement of quiet and reasonable running throughout this section of the country. As a consequence, relations with the public and local authorities are of the best. With a population of 15,000 inhabitants, there has never been an arrest in the city and not a single automobile accident, although Geneva is on the great highway between Buffalo and Albany.

It is hoped that visiting automobilists this summer will drive quietly and reasonably through the city, and thus help continue the good impression that has been created.

Detroit Club's Second Century Run.

DETROIT, June 10.—Last year's "century" held by the Automobile Club of Detroit proved to be such an enjoyable affair for all concerned that it has been decided to repeat it on Saturday next. S. D. Waldon, chairman of the runs and tours committee, is confident of eclipsing last year's event manyfold, as close to 100 entries have already materialized. The day is to be a gala event in more respects than one, as it will be marked by the opening of the new clubhouse, which will be celebrated by a reception and lunch during the afternoon. The combination promises well, and, as Chairman Waldon puts it, both the committees are going to make June 15 a day "to be marked with a white stone."

THE AUTOMOBILE CALENDAR.

AMERICAN.

Shows and Meetings.

Oct. 31-Nov. 7..—New York City, Madison Square Garden, Eighth Annual Automobile Show, Association of Licensed Automobile Manufacturers.

Nov. 30-Dec. 7..—Chicago, Coliseum and First Regt. Armory, Eighth Annual National Automobile Show, and First Annual Commercial Vehicle Show, National Association of Automobile Manufacturers.

Races, Hill-Climbs, etc.

June 19-22.....—New York City, Sealed Bonnet Contest, under the auspices of the Automobile Club of America.

June 20.....—Albany, N. Y., Annual Tour of the Albany Automobile Club; Route, via New York and Asbury Park, to Atlantic City.

June 26.....—Buffalo, N. Y., Orphans' Day Celebration, Automobile Club of Buffalo.

June 27-28.....—Chicago, Elgin-Aurora Reliability Run, Chicago Motor Club and Chicago Automobile Trade Association.

June 29.....—Reading, Pa., Fair Grounds Track, Race Meet, Reading Automobile Racing Association.

July 4.....—Harrisburg, Pa., Peter's Mountain Hill Climb, Motor Club of Harrisburg.

July 4.....—Houston, Texas, Race Meet, Houston Automobile Club.

July 10.....—Cleveland, O., Start of Fourth Annual Tour of the American Automobile Association, for the Glidden Trophy. Finishes in New York City on or about July 23.

July 13.....—Chicago, Race Meet for the Entertainment of the Glidden Tourists, Chicago Automobile Club.

July 25-28.....—Providence, R. I., Annual Meet of the Federation of American Motorcyclists.

Aug. 1.....—Algonquin, Ill., Hill Climb, Chicago Motor Club and Chicago Automobile Trade Association.

Aug. 9-10.....—New York City, Brighton Beach Track, 24-hour Automobile Race, United States Motor Racing Association.

Sept. 2.....—Bridgeport, Conn., Labor Day Hill Climb, Sport Hill, Bridgeport Automobile Club.

Sept. 5.....—Chicago, Cedar Lake Economy Run, Chicago Motor Club and Chicago Automobile Trade Ass'n.

Sept. 14.....—Albany, N. Y., 95-mile Road Race, under the auspices of the Albany Automobile Club.

Oct. 19.....—St. Louis, Mo., International Aerial Race of the Gordon Bennett Prize. Aero Cub of America.

Motor Boat Races.

June 15-28.....—Kiel (Germany) Motor Boat Races.

July 20.....—New York to Marblehead, Mass., 270-mile Motor Boat Race. New Rochelle Yacht Club.

Aug. 13-15.....—Chippewa Bay, St. Lawrence River, Gold Challenge Cup Race; American Power Boat Ass'n.

Aug. 22.....—New York to Jamestown (Va.), Annual Cruise American Power Boat Association.

Sept. 2-6.....—Jamestown (Va.) Exposition, Motor Boat Races.

FOREIGN.

Shows.

Nov. 12-Dec. 1..—Paris, Exposition Decennale de l'Automobile, Grand Palais, Esplanade des Invalides, Automobile Club of France.

Races, Hill-Climbs, etc.

June 14.....—German Emperor's Cup, Taunus Circuit, Imperial Automobile Club.

June 20-23.....—American Gold Cup, Start from New York of European Tour for American Cars, Georges Dupuy, secretary, 1402 Broadway, New York City.

June 14-29.....—Scottish Reliability Trial, Scottish Auto Club.

July 2.....—Grand Prix, Automobile Club of France.

July 14, 1908....—Paris to London, Aerial Race.

July 15-18.....—Ostend Week, Record Trials, Automobile Club of Belgium.

July 21.....—Ardennes Circuit (Belgium).

July 31.....—Liedekerke Cup for Touring Cars, Ardennes Circuit, Belgium.

July 31-Aug. 8..—Belgium Regularity Contest for Touring Cars, A. C. of Belgium.

Aug. 1-7.....—Criterium of France, 1,750 Miles Touring Competition and 250-mile Race for the Press Cup. A. C. of France.

Aug. 11-29.....—France, Coupe de Auvergne.

Sept. 1-2.....—Italy, Brescia Circuit, Florio Cup. A. C. of Italy.

MICHIGAN STATE AUTOMOBILE ASSOCIATION.

DETROIT, MICH., June 10.—The Michigan State Automobile Association of the A. A. A. has been organized not only with the object of promoting the pleasure of its members, but to increase the number of good roads in the State. Edwin S. George, who is active in all things pertaining to automobiling, is president, and is also the chief officer of the Detroit Automobile Club, and largely responsible for making the Detroit organization as large and influential as it is. Mr. George's activity has been instrumental in bringing about the erection of a fine clubhouse.

EDWIN S. GEORGE.
President.

The vice-president of the organization, Dexter M. Ferry, Jr., is also of Detroit. He is chairman of the legislative committee of the Detroit club, and as such has made it his business to watch out for the interests of automobilists of the State when new measures have come before the legislature.

Dr. D. Emmett Welsh, of Grand Rapids, is secretary of both the State body and the Grand Rapids club. He is also a member of the board of directors of the national organization and is one of the best known professional men in Grand Rapids.

James R. Jackson, of Grand Rapids, the treasurer of the association and chairman of the membership committee, is one of the most enthusiastic autoists anywhere. He is a member of the touring board of the A. A. A. He deserves a large part of the credit for the clubhouse recently erected at Cascade by the Grand Rapids club.

DEXTER M. FERRY, JR.
Vice-President.

DR. D. E. WELSH.
Secretary.

JAMES R. JACKSON.
Treasurer.

WANTED—A GOOD LONG HILL TO CLIMB.

CLEVELAND, O., June 10.—Saturday's event, which was to have been held at Gates Mill hill, and which has aroused unending interest among local autoists, had to be postponed owing to the opposition of residents in the vicinity to the use of the hill for that purpose. Since then numerous localities have been heard from, but the contest committee of the Cleveland Automobile Club has come to no decisions as yet regarding the place or time of holding the postponed meet. The situation is somewhat complicated by the unusually bad condition of the roads intervening between Cleveland and some of the more promising places for the climb, as well as the fact that the hills themselves are not in the best of condition. No less than sixty-five entries have been received to date for the eight events on the program, and it is confidently anticipated that this number will be largely augmented as soon as something definite regarding the holding of the climb is made public.

TO RUN NEW JERSEY TIE OFF LATER.

Out of the many suggestions made as to the proper awarding of the Shanley and Sinclair prizes for touring cars and runabouts, for which seven cars were tied in the first class and five in the second in the New Jersey Automobile and Motor Club's recent run, has come one that is satisfactory to all concerned, and that is, "Fight it out on the same line"—and "may the best car win," might be added as an afterthought, for each is determined that the honors will be all his when it comes to settling the draw. In the meantime, the names of the cars and the contestants are to be engraved on the cups, though this was opposed at first. J. B. Ryall, whose Matheson finished with a clean score, and F. E. Boland, whose National was in the same class, were both in favor of immediately holding another deciding test, and some of the others held a similar opinion.

The meeting of the winners was held at the same time as the gathering of the Endurance Run Committee, at the clubhouse in Newark, and with the official announcement of the scores by the latter was that of the determination of the former to enter any future contest held, when the car finishing first will be awarded the respective trophy. Before this was settled upon, several other suggestions were made, one of which, that of drawing for the prize, met momentary favor among the runabout winners, but J. W. Mason, who was the lucky man, refused to accept it and stated his desire to have the prize competed for in some future event. J. B. Ryall announced his intention of consulting with the donor of the prize in regard to holding a deciding test later.

SEVEN TIE IN LONG ISLAND TEST.

Apparently the Long Island Automobile Club has undertaken an impossible task. In its two-day endurance test, on Decoration Day, ten machines tied with clean scores in three classes. To get the trophies off his hands, Chairman Charles Jerome Edwards, of the Touring Committee, selected a 186-mile route, from the clubhouse to Riverhead and back, and invited the invincibles to try conclusions. Although the roads were the roughest and steepest to be found on the island, being along the hilly north shore both outward and returning, it made no difference to the machines, every one arriving at controls on time, consequently having clean scores. Classes A, B and C had to furnish an average of 15, 18 and 20 miles an hour respectively.

When the observers' cards were examined it was found that the Oldsmobile could be eliminated from Class B for having lifted off the commutator cap to remove a little gummed oil, and that in Class C the Pope-Toledo could be marked down for changing a spark plug and the Matheson for losing its dust pan. This left a tie in Class A between a Cadillac and a Maxwell; in Class B between Pope-Hartford and Columbia, and in Class C a three-cornered tie between Packard, Pierce and Winton. Club officials declare it is a hopeless task and will not try again. The competitors in the run were:

CLASS A.

Cadillac, 10-horsepower, Jasper D. Rouke, tied.
Maxwell, 18-horsepower, I. C. Kerkhan, tied.

CLASS B.

Pope-Hartford, 25-horsepower, C. G. Arnold, tied.
Columbia, 24-horsepower, E. H. Barnum, tied.
Oldsmobile, 35-horsepower, R. E. Pardee, penalized.

CLASS C.

Winton, 40-horsepower, C. A. Carlson, tied.
Pierce, 40-horsepower, E. R. Strong, tied.
Packard, 30-horsepower, S. H. Burns, tied.
Matheson, 40-horsepower, R. G. Kelsey, penalized.
Pope-Toledo, 50-horsepower, A. N. Wilcox, penalized.

BAY STATERS WILL RUN TO GLOUCESTER.

BOSTON, June 8.—The annual June outing of the Bay State Automobile Association will be held this year on Saturday, Sunday and Monday, June 15, 16 and 17, at the Colonial Arms, an impossible task. In its two-day endurance test, on Decoration program for the three days.

LAST 1907 LOCOMOBILE AND THE FACTORY STAFF.

On June 8 the Locomobile Company put the finishing touches to the last completed car of this year's output. Designer A. L. Riker is at the wheel, superintendent E. F. Russell beside him. In the tonneau from right to left are Publicity Manager J. A. Kingman, William Shortsleeve, A. C. Schults and Harry Stillman.

OLD ADMINISTRATION RETAINS THE REINS.

BOSTON, June 10.—Because of an effort which was made by some of the members of the Boston Automobile Dealers' Association to oust the present administration, which has been in control almost since the organization of the association, and substitute a new board of directors, the annual meeting last week was the largest and most exciting ever held by the dealers in this city. Every member had been canvassed prior to the meeting and there was a large attendance. The opposition, however, was only successful in electing one new member to the board of directors, the other members being re-elected. The new member is Charles E. Fay, manager of the Ford branch. The members re-elected are J. H. MacAlman, manager of the Electric Vehicle Company branch; F. A. Hinchcliffe, manager of the Winton branch; A. P. Underhill, of the Reed-Underhill Company; J. W. Maguire, of J. W. Maguire & Co.; S. K. Dingle, of the Concord Motor Car Company; George H. Lowe, of the George H. Lowe Company; J. S. Hathaway, of the White branch, and Harry Fosdick, of the Harry Fosdick Company. The officers were re-elected as follows: President, J. H. MacAlman; vice-president, George H. Lowe; treasurer, Harry Fosdick, and secretary, Chester I. Campbell. Secretary Campbell was elected manager of the show to be held in March, 1908.

SPLITDORF MOVES WAY UPTOWN IN N. Y. C.

The Splitdorf Laboratory, for many years located at 17-27 Vandewater street, which is in the heart of downtown New York, has moved almost to the other end of the city—261-265 Walton Avenue, corner 138th Street, in the Borough of the Bronx. Their new plant is a six-story-and-basement structure of the latest fireproof construction. It has a total floor space of over 50,000 square feet, every foot of which will be utilized by the Splitdorf Laboratory for the production of the specialties with which the name for so many years has been identified. One important feature is the installation of the Edison breakdown system, which can be thrown in at a moment's notice, thus insuring uninterrupted work.

SELDEN AUTOMOBILE CO.'S FIRST CAR READY.

ROCHESTER, N. Y., June 10.—The first car to be constructed by the new Selden Automobile Company will be given a tryout this week. It will be equipped with a motor of sixty horsepower, and will be constructed throughout of the finest material obtainable.

TWO-WHEELERS TO HAVE ELIMINATING RUN.

In order that there shall be no annoying cases of drawn battles to settle at the end of its endurance run, H. J. Wehman, chairman of the committee in charge of the national endurance run of the Federation of American Motorcyclists, has prepared a set of rules that will make the honor worth striving for and the victory well-earned. The event will form a curtain raiser for the annual meet of the organization at Providence, R. I. It will be started from New York City at 4:30 A.M., Tuesday, July 30, and the first day's run will be to Springfield, Mass., 190 miles, via Poughkeepsie, N. Y., Lakeville, Conn., and Lenox, Mass. The remainder of the run, 87 miles, is to be covered in half a day and the route will be via Worcester. Controls for the day and half run will be at Poughkeepsie, Springfield, Worcester and Providence, the schedule being based on a running time of 15 miles an hour, the penalties to be one point for each minute late and two points for each minute early, with a five minute allowance for variation of watches. The competitors will be divided into two classes, A and B, the former consisting of all single-cylinder machines and the latter, two or more cylinders, each starter being given an initial credit of 1,000 points. In order that only one rider shall finish with a clean score, the hill-climbing capacity of the machines is to be tested on Jacob's Ladder in the Berkshires, and its fuel consumption at the track in Providence, by starting the competitors off with a pint of gasoline each. The first ten to finish in the first class and the first five in the second class will be deemed Honor Men and receive gold medals, while each leader will be awarded a diamond medal. The entry fee is $5, and the entries close July 20, with the chairman, H. J. Wehman, 108 Park Row, New York City.

ANOTHER NON-STOP CADILLAC RECORD.

Over 1,000 miles without the motor stopping one single revolution, and that after the car had already been driven 31,000 miles during the past four years of constant service, is the recent accomplishment of a 1903 Model A single-cylinder Cadillac, formerly owned by Roy McCardell, the well-known humorist.

The start was made from the City Hall in Chicago, on Monday morning, May 27, and his Honor, Fred Busse, the newly elected Mayor of that city, wielded the crank which set the engine going.

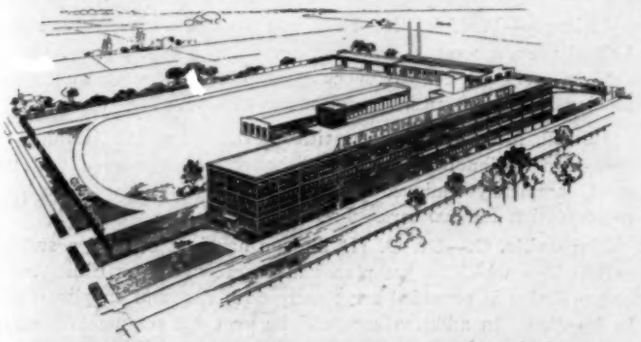
The run was a most strenuous and nerve-racking one, for the most part over the streets of Chicago and suburbs. The total run covered 1,221 miles. It might have run several times that distance without stopping, and it was thought for a while to continue the run until the engine should stop, but owing to the fatigue of the drivers, who had been on duty for many hours with but little sleep when each relieved the other, the idea was abandoned when the car had completed the trial as originally planned, and it was retired with well-earned honors.

TO LAY CORNERSTONE OF MAXWELL PLANT.

Saturday, June 22, is to be a gala day for Newcastle, Ind., for it will mark an important step in the town's history. On that day, with much formality, speech-making and general handshaking, the community's advent as a factor in the American automobile industry is to be celebrated. To say that the inhabitants have laid themselves out some in preparation for the auspicious event is to put it mildly indeed. The ceremonies are to be given at 2 P. M., when several lodges and societies will assemble in the Court House Square and march to the site of the factory. The "speechifying" will include addresses by Vice-President Fairbanks, the guest of honor, and by Judges Bundy and Forkner and the Hon. C. S. Hernley. The town will be suitably decorated, and nothing is to be left undone to make the Maxwell coming a thing long to be remembered in local history.

THOMAS DETROIT PLANT NEARLY FINISHED.

DETROIT, June 10.—Some idea of what the new plant of the E. R. Thomas Motor Company at Detroit will look like when completed may be obtained from the accompanying illustration. At the present writing the construction of the plant has already reached an advanced stage, and the company not only expects to complete the building within a very short time, but also to have the entire equipment installed and the machinery turning by



THOMAS DETROIT FACTORY AS IT WILL APPEAR COMPLETED.

September next. The construction is all of reinforced concrete, and the main building is already up to the second floor. The plant will eventually cover the large plot of ground which has a frontage of two city blocks on Detroit's famous Jefferson avenue. This year's output of Thomas Forties has already been completed, so far as the construction departments are concerned, and by the time this appears the testers will have finished with the last of them, as it is expected to ship them on June 15. The total number of touring cars and runabouts turned out reached 503—a figure that will not only be greatly surpassed next season, but earlier deliveries will also be made, due to the largely increased facilities at hand.

SOME TRADE NEWS FROM QUAKERTOWN.

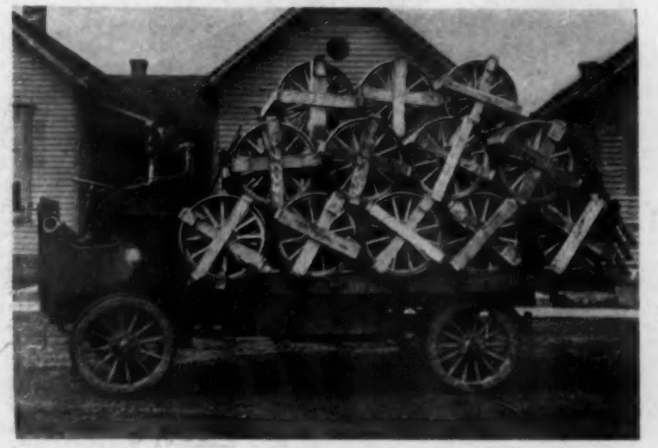
PHILADELPHIA, June 10.—The Harry S. Houpt Company, of New York, opened its handsome new local branch house at 139-141 South Broad Street on last Saturday afternoon. The complete line of Thomas cars was inspected by hundreds of visitors during the day, while Manager Andrew S. Robinson, a former Quaker, who has been connected with the New York house for a number of years, did the honors.

The Carter Motor Car Corporation, of Detroit, has opened an office in the Commonwealth Trust Building, at Twelfth and Chestnut Streets, and is offering treasury stock at $1 per share to raise funds for the erection of a factory at Berwyn, Md., a suburb of the National Capital.

The Dragon Automobile Company has secured the services of J. C. Middleton as assistant sales manager. He was formerly connected with the Autocar sales department at Ardmore.

PREMIER BRINGS OUT COMBINATION CAR.

Concurrently with their pleasure car business, the Premier Motor Manufacturing Company, Indianapolis, Ind., has been devoting considerable attention to the commercial vehicle end, and their study has been along somewhat out of the ordinary lines. The first concrete results of this extended investigation are illustrated by the accompanying photographs, and, though they are



PREMIER TRUCK IN ITS EVERYDAY BUSINESS ROLE.

not turning these vehicles out for the market as yet, owing to the very heavy demand for regulation pleasure cars, the possibilities of a car such as that shown are evident at a glance. The vehicle shown has proved very successful in service, and has been used steadily for transferring freight to and from the railroad depots, while when equipped with removable seats it accommodates a good number of passengers, as shown by the view of the Premier baseball team, bound for its regular Saturday afternoon game, the other photograph illustrating it with a load of wheels for Premier cars. It is designed for a two-ton load, but has an over-

THE TRUCK TRANSFORMED AND ON PLEASURE BENT.

load capacity of almost double that, frequently carrying as much as 7,400 pounds. It is equipped with the standard 24-horsepower Premier motor, sliding change-speed gear, 30-inch wheels, solid tires, and is carried on three-quarter platform springs in the rear and semi-elliptics in front.

AUTOMOBILE IMPORTS SHOW A FALLING OFF.

Advance import returns for the month of May past show a decline in the value of imported cars entered at the port of New York during that period as compared with the same month a year ago. The total valuation in 1906 reached $466,230.06 and represented 134 cars, while this year but 120 have been brought in with a value of $409,926.29.

LATEST ADDITION TO THE BERLIET LINE LOOKS POWERFUL.

New 40-horsepower Berliet runabout, the production of the American Locomotive Automobile Company, that is a symphony in cream, offset by delicate green trimmings. It is one of the very fast three seaters that is credited with being able to do better than a mile a minute.

VERY HEALTHY WESTERN AUTO DEMAND.

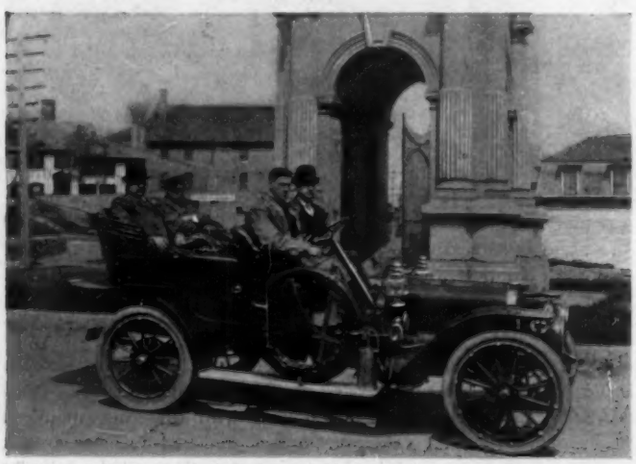
Robert E. Graham, vice-president of the Acme Motor Car Company, of Reading, Pa., recently returned from the Rocky Mountain country and expressed the following opinions:

"The Pacific coast at this time, so far as my personal observation goes, is about the best market for low and medium-priced cars, that there is in the country. Because of the condition of the streets in San Francisco, rendering them almost impassable for horse-drawn vehicles and because of the long-continued tie-up of the street car lines, the automobile as a means of getting about is almost a necessity.

"A very large trade, too, has grown up with the various mining camps. Distances that were formerly a matter of days for animals to cover, are readily traversable in a comparatively short time with the automobile—a few hours instead of a few days. The most unsatisfactory feature of the Western market, as far as an Eastern factory is concerned, is the great delay in receiving shipments. The railroads claim, however, that they are gradually overcoming this and look for better results in the future. Neither the Pacific Coast nor that portion of the Middle West which I saw appears to have felt the recent stock market depression in any degree.

A ONE-DAY RUN WORTH MENTIONING.

A run that was a record in several respects was made Sunday, when two women drove a 1903 car alone from Springfield to New York in twelve hours total time, and less than ten hours actual running time. The distance is 157 miles, or more than the average day's run in the Glidden contest and more than will be the task of the cars in the sealed bonnet contest of the Automobile Club of America next week. The women were Mrs. E. Philips, wife of Dr. Calvin Philips, and Mrs. Arthur Jervis, both of New York City. The car was a single-cylinder Knox, of ten-horsepower, that has been in continuous service since 1903. The car is that of Mrs. Philips, and she was the driver. Mrs. Philips is as proficient in the care of the car, and even in its repairs, as a professional chauffeur, and takes pride in going out alone with it. The start from Springfield was made at 10 A. M. The roads were very bad, especially from Springfield to Hartford, but the women brought the car through without mishap, stopping for meals more than two hours and arriving at the Rutland, Fifty-seventh street and Broadway, at 10 P. M.



VISITING OLD PLYMOUTH ROCK IN A "FULL JEWELED" CORBIN.

THINGS DOING AMONG THE GARAGES.

Rochester, N. Y.—Fire Marshal Walter has been asked permission by A. Vernon Hart to construct a garage in Cambridge street, near Park avenue. The building is to be of brick, two stories high, and will cost $12,000.

Toledo, O.—J. J. Maher has just purchased the garage and rubber business of the Cooney Company, at 120-122 Twenty-second street, and will continue the business without change under the name of the Maher Garage Company.

Chicago.—Wolf & Ring have just opened a new garage on Leland avenue, west of Evanston avenue, this city, that is up-to-date in every respect. A specialty will be made of towing and touring livery, sundries, repairs and overhauling.

Lowell, Mass.—Under the title of the City Hall Garage, a new auto station has been established on Moody street. It is most completely equipped in every respect, and has ample accommodation for 100 cars. Fred Walsh is the manager.

Marysville, O.—Dr. O. H. Thorpe has just opened a small garage here which he has placed in charge of Byron Ellis. Accommodation is provided for twenty odd cars, and supplies will be handled. In addition cars will be kept for renting and machines will be sold on order, no stock being carried.

Muskogee, I. T.—The Southwestern Automobile & Vehicle Company has been organized here with a capital of $25,000. W. E. Gordon is president; J. S. Weeks, vice-president; W. C. Frankline, secretary; A. G. Harmon, treasurer, and W. R. Waton, second vice-president. A regular garage business will be done.

Providence, R. I.—The C. D. Snow Company is now running at full blast in its new quarters at Broad street and Potter avenue, which they took possession of some time ago. The facilities that have since been installed make this one of the most ambitious establishments in the New England district. The company confines its attention to the Stevens-Duryea line.

Nappanee, Ind.—Keller & Jeffries are building a new garage to accommodate about twenty-five cars. It measures 30 by 60 feet and is two stories high, and will be equipped with an up-to-date repair shop, as well as other facilities for taking care of machines. Nappanee is on the route of the Glidden Tour, and the proprietors expect to have their establishment in running order by the time the A. A. A. tourists strike the town.

City of Mexico.—Under the title of El Garage Anglo-Mexicano, what is probably the most extensive auto establishment south of the Mexican border, has just been inaugurated in the Calle Providencia, number 7. Owing to its distance from other facilities it is most completely equipped in every respect, having a large machine shop and carrying a very large stock of spares. As its name indicates, it makes a specialty of British cars, handling the Argyle, Leader and Humber, beside carrying a very complete assortment of accessories and clothing. The company is a corporation with a capital of $100,000, all paid in.

BRIEF ITEMS OF NEWS AND TRADE MISCELLANY

Application for membership in the New York Automobile Trade Association has been made by the Waltham Manufacturing Company, makers of the Waltham-Orient, and the Corbin Motor Vehicle Corporation.

Additional evidence that the motor vehicle for commercial purposes is surely and rapidly displacing the horse-drawn vehicle is furnished by Arnold, Constable & Co., New York City, who have just received four Maxwell delivery cars and put them into commission. It is very probable that this big house will dispense with its horse service entirely.

Returning from a three weeks' visit to the Pacific Coast cities, Charles B. Shanks, general sales manager of the Winton Company, declares that San Francisco looks infinitely better than when he was there just after the fire. Automobile interest in the West is growing with the country, the demand for highest quality cars being decidedly on the increase.

The annual excursion and picnic of the Winton employees, at Cedar Point, June 17, will also be participated in by the employees of the American Ball-Bearing Company, and the Baker Motor Vehicle Company. The three big plants of these companies will close to give the excursion right of way. A ball game between the Winton and the Ball-Bearing teams will be a feature.

Work is progressing favorably on the new steel and concrete building to be used for the factory of the Pennsylvania Auto-Motor Company, at Bryn Mawr, Pa. The plant will be so arranged that the raw stock can be taken into the factory from a railroad siding at one end, pass through the building, and return to the same siding. Arrangements are being made for 500 regular machines next year, deliveries to begin early in September.

In a recent report made by the Chamber of Commerce, Syracuse, N. Y., it was shown that the automobile was the greatest of their one hundred and thirty different industries, the H. H. Franklin Manufacturing Company having increased their business during the past three years to a point where they now employ seventeen hundred men, which is more than the total number employed by the fifty-two clothing manufacturers, the forty-eight foundries and machine shops, and nearly twice as many as employed by the three typewriter factories.

Toledo, Ohio, comes into notice just at this time, when speed laws are so widely discussed, by cutting down the speed limit to ten miles per hour and organizing a motor-cycle police corps, who are keeping close tab on automobile speeders, and particularly the Pope-Toledo testers. A few years ago the Pope people established a course on the outskirts of the city, but were compelled to retire to the "tall timbers" on account of speed laws. The company has now selected a stretch outside the city limits, which includes sand, mud, and all kinds of hills, and think they now have a course which cannot be beaten for testing.

Michelin & Cie, of Clermont-Ferrand, France, have just notified their American agents, E. Lamberjack & Co., of New York City, of another remarkable performance by Michelin tires. Starting from Paris at 2 p. m., May 6, Sorel, in a 60-horsepower De Dietrich stock car, covered the 930 miles of rough roads between Paris and Madrid in the wonderful time of 28 hours 14 minutes. This record is attested by officials, and not only lowers the best previous time for automobiles, but is faster than the fastest express train running between these two cities. The run was made in a rainstorm, at an average rate of thirty-four miles per hour. Michelin tires were used during the entire trip.

RECENT BUSINESS CHANGES.

The Rambler agency in Chicago, which for a long time has been located in Wabash Avenue, near Congress street, has removed to 1462-1464 Michigan Avenue, in the heart of the local auto selling district.

F. E. Goodwin has purchased the property of the Motor Components Manufacturing Company, of Des Moines, Iowa, from the receiver for $2,555.61. The company recently went into the hands of a receiver upon petition of Grover Hubbell and B. S. Walker. W. H. Kitto, formerly secretary, now has suits pending for $100,000 damages against these parties.

NEW AGENCIES ESTABLISHED.

The Corbin Motor Vehicle Corporation, of New York, has issued engraved cards of invitation for an inspection of its new offices and salesrooms, at 1892 Broadway.

The Dragon Automobile Company, of Philadelphia, is about to open a city showroom and office in that city to handle retail trade. The new headquarters will be located in the latest addition to automobile row, opposite the Union League.

William G. Isbell, formerly associated with Guy R. Pierce in the Chicago agency for Baker electrics, has organized a company under the title of William G. Isbell & Company, and will represent the American Simplex, made by the Simplex Motor Car Company, of Mishawaka, Ind. The new concern will retain the old headquarters at 1413 Michigan Avenue, Chicago.

Indianapolis has a new concern in the selling trade, the Indianapolis Motor Car Company, with temporary headquarters at 114-119 Kentucky Avenue, and the following officers: A. W. Markham, president; R. A. Radle, vice-president and general manager, and Paul Smith, secretary and treasurer. The company will handle the Dragon and the Logan line of commercial cars.

The Renault Freres selling branch, of New York City, announces through Manager Paul Lacroix a new sub-agent for Renault cars—Louis P. McNamara, whose salesrooms are located at Broadway and Forty-eighth street. This is the fifth New York agency established in less than two years, the others being the Palais de l'Automobile, Brewster & Company, Demarest & Company, and Cryder & Company.

The Baker Electric Vehicle agency, with Guy R. Pierce as general manager, has closed a long lease on the new auto garage and salesroom at 1714 Michigan Avenue, Chicago, and from this location Baker electrics will be disposed of in the future in that city. A complete new electric plant has been installed, and when the decorators have fully completed their work on the salesroom it will be one of the most elaborate stores on the avenue.

PERSONAL TRADE MENTION.

Clinton R. Mabley has entered upon his duties as general manager for the Importers' Automobile Salon, with offices in the new Bryant Park Building, Sixth Avenue and Forty-second Street, New York.

Orville Sprecher, formerly vice-president and superintendent of the Prest-O-Lite Company, resigned on June 1 to join forces with the Avery Portable Lighting Company, and will reside in Milwaukee in the future.

R. D. Aldrich has resigned his position as manager of the New York branch of the Rose Manufacturing Company to become sales manager of the Twentieth Century Manufacturing Company, 19 Warren street, New York.

Thomas F. Ahern, formerly of Cleveland, has been apopinted general superintendent of manufacture for the Wayne Automobile Company, of Detroit. Mr. Ahern has taken up his residence in Detroit and entered upon the duties of his new position.

At a special meeting of the directors of the Joseph Dixon Crucible Company, of Jersey City, N. J., held May 31, to take action on the death of John A. Walker, vice-president and treasurer, George T. Smith was elected vice-president; George E. Long, treasurer, and Harry Dailey, secretary.

J. H. O'Brien, for the past year factory manager for the Wayne Automobile Company, Detroit, Mich., and prior to that time in a similar position with the Ford Automobile Company, of the same city, has just severed his connection with the Wayne Company, and though Mr. O'Brien gives no hint of his future plans, his long experience in the automobile building field makes it certain that he will be heard from in the near future.

A NEW THIRTY-TON TRUCK.

Detroit again comes forth as the sponsor of a novel commercial vehicle. It is a heavy truck of the heaviest kind, for, although its power plant only consists of a 40-horsepower gasoline motor, its weight all on is something like seven tons, and it is said to have a carrying capacity of approximately thirty tons, in addition to having some power still in reserve to draw a trailer or two. It is the invention of John E. Myers, of Sheperd, Mich., who has been at work on it for the past half year. The rear wheels are 52 inches in diameter by 20 inches face, and the front wheels are 44 inches in diameter by 14 inches face. The truck is to be shipped to Alabama.

HOPEWELL TIRE CASE PATENT.

F. B. Hopewell, of Hopewell Brothers, Cambridge, Mass., has just been granted what is claimed to be a basic patent covering the design of a spare tire case, such as is universally used for carrying extra shoes on the car. The patent is No. 854,215, and was issued May 21,

1907, and it is the patentee's opinion that his claims broadly cover an annular tire case, as the only limitation in the patent is that it must be an annular case, though not specially limited to being a continuous case.

Claim 1 reads as follows: "An annular tire case composed of material having at each edge a longitudinal pocket, and a cord in each pocket to retain the pocketed edges of the case in a circle smaller than the circle defining the circumference of the tire." The case thus being caused to fit the tire by tightening a cord which contracts the edges of the case to a diameter smaller than that of the tire. The case itself was illustrated and described in THE AUTOMOBILE of May 23.

TRADE PUBLICATIONS RECEIVED.

From the Gearless Transmission Company, Rochester, N. Y., is to hand the firm's catalogue of 1907 models. It is well produced in colors, with illustrations on every page, and deals with all the models manufactured.

Three interesting touring stories, descriptions of new models and news culled from various quarters, is the bill of fare of No. 26 of the Rambler Magazine, issued by the Thomas B. Jeffrey Company, of Kenosha, Wis. Though especially appealing to the Rambler owner, the magazine should be interesting to all automobilists.

A new booklet is out from the Firestone Tire and Rubber Company's headquarters, at Akron, Ohio, dealing in general with the various types of pneumatic tires manufactured by this company, and giving special attention to the Safety Universal rim. Illustrations explain the constructional features of the Firestone detachable, and a number of halftones show the operation of mounting and dismounting.

There is a particularly handsome appearance about the Thomas Flyer catalogue, issued by the E. R. Thomas Motor Company, Buffalo, N. Y. Excellent halftone views of the Buffalo and Detroit works and of the different agencies throughout the country, complete and detailed views of the car and explicit text, unite to make it one of the best of trade catalogues. The half-tone illustrations of mechanical parts and the sectionalized views of the motors are particularly helpful to those wishing to obtain a good knowledge of the construction of the Thomas Flyer and the Thomas Forty.

AN AFTERTHOUGHT OF JONES'.

"A Past Performance" is the title of an artistically executed little brochure from the Publicity Press concerning an event that has long since gone down the line into history, reckoning at the speed at which automobile history is made. To the ninety and nine who responded to the glad call, it will bring back a pleasant reminder of an evening well spent, and to the one who didn't, a wish that he had cut it out, whatever it happened to be, and attached himself to the gay bunch that went on the special with "eighteen speeds forward and no reverse"—to the place that is "forty-five minutes from Broadway"—the Jones Speedometer Factory at New Rochelle. It was hardly necessary to add that last, for every man who got there recalls the day, date, time and place, while those who got bids and didn't materialize have been hearing of it ever since. The little book is a fitting commemoration of the event.

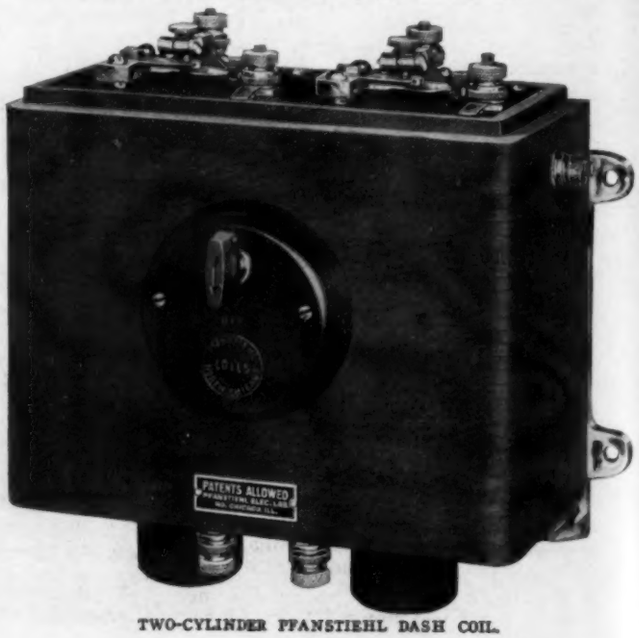
INFORMATION FOR AUTO USERS.

Gauntlet Monograms.—In addition to the already widely varied line of monograms turned out by the J. W. Colgan Company, Boston, Mass., this firm is making a specialty of some neat designs to be applied to automobiling gauntlets, samples of which are illustrated by the

COLGAN'S MONOGRAM GAUNTLETS.

accompanying cut. This, of course, only shows two designs, there being quite a variety. In connection with the addition of this new line, these makers have just issued a 32-page catalogue showing some of the many purposes for which they make monograms in all styles, such as for automobile radiators, medallions for robes, fittings and the like, as well as a variety of special insignia, trade marks and similar pieces.

"Caterpillar Flame Coils."—This is the rather unusual name given by the Pfanstiehl Electric Laboratory of Worth, Chicago, Ill., to their line of dashboard jump-spark coils. The peculiar wormlike appearance of the discharge of the coils in question, which is claimed by the makers to give a maximum of efficiency in operation on a minimum current consumption, is responsible for their title. In addition, these coils possess numerous other advantages, such as an extremely rapid and silent-working vibrator, which, taken in connection with an electrical design that eliminates the objectionable sparking at the vibrator points, combine to make as close an approach to the autoist's ideal of a troubleless coil as it is possible to turn out. These results are obtained by methods covered by American and foreign patents and an accurate balancing of the primary and secondary windings. The latter is wound in 14 sections, and is of unusually large wire. The sections are connected in pairs, and are thoroughly insulated so as to be proof against excessive overloads. The primary is wound with much finer wire than is ordinarily employed on induction coils of this type. The coils are all made on the unit system, and each unit is patterned after the large x-ray coils on which these makers have been experimenting for the past five years. It is possible to take x-ray photographs with any of the regular automobile type of units, using current at a potential of 10 volts, which is somewhat remarkable, and is evidence of the great intensity of the discharge. These coils are made for 1, 2, 4 and 6-cylinder motors, the illustration showing the twin type.



TWO-CYLINDER PFANSTIEHL DASH COIL.

Michelin's Handy Tire Gauge.—*Plus un pneu est gonflé, moins il chauffe.* To the experienced tire user, this is an axiom. The better a tire is inflated, the less it heats. Simply because there is less opportunity for friction between its different parts and principally between the shoe and the inner tube. But how many drivers, even after considerable experience, can tell offhand when a tire is properly inflated? It was easy enough to test the old bicycle tire merely by attempting to compress it with the hand, but an automobile tire may be little more than three quarters inflated and still give no indication of it, especially when viewed with the car empty. On the whole there is probably nothing so important in the tire user's breviary as the matter of proper inflation, and to make this an easily ascertainable matter, Michelin et Cie have devised a neat and compact pressure gauge of which circulars have been sent to their U. S. agents, E. Lamberjack & Company, 31-33 West Thirty-first street. As shown by the illustration this is readily attachable to the valve by means of the quick adjustment type of screw. Once in place, the button on top is pressed to obtain a reading, the dial being calibrated in kilos. And, say the makers, exhaustive tests have shown that a tire carrying 5 kilos pressure, which represented its proper degree of inflation, lasted three to five times as long as the same size tire inflated to 2 1-2 kilos and run on the same car under the same conditions throughout the length of the test.